
Volume 71 No. 3, September 2008
Themed issue: Inflation

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ISSN 1174-7943 (print)
ISSN 1177-8644 (online)



Editor's note

This edition of the Reserve Bank *Bulletin* is built around the theme of inflation. This theme is on the minds of many central banks around the world, including the Reserve Bank of New Zealand. We face the difficult challenge of reining in elevated inflation, against a background of high oil and food prices, slowing growth and ongoing global financial instability.

Our first article in this edition, by Governor Alan Bollard and me, discusses how the Reserve Bank's primary function of price stability can best be pursued in circumstances like the present, when forces on the economy push powerfully and persistently in one direction. We note that New Zealand's long-serving inflation-targeting framework has served the country well, and continues to do so. However, we also argue that it can only do so much to promote stability. Above all, there is a need to ensure that, when monetary policy operates flexibly to cope with these powerful forces, the medium-term objective of 1-3 percent inflation continues to anchor inflation expectations, which is what gives us scope to be flexible in the first place.

Our second article, by Satish Ranchhod, discusses how inflation developments overseas over the past decade or so have influenced inflation pressures in New Zealand. Our main trading partners enjoyed low inflation through to the early 2000s, but are now experiencing higher inflation across the board. This period of higher inflation worldwide is due to prolonged strengthening of global activity until very recently, itself partly reflecting ongoing Asian and emerging market growth. Strengthening global demand increased the pressure on productive resources, resulting in higher inflation in the prices of traded goods from all regions, as well as strong increases in the prices of commodities in international markets.

David Gillmore reviews in our third article the research on why inflation is costly, and why price stability is therefore important. Inflation tends to benefit the wealthy at the expense of the poor and those on fixed incomes, and reduces economic growth over the long term. Recent research suggests that inflation above about 3 percent in industrialised countries has materially harmful effects on long-run growth.

Our fourth article is an interview with Professor Robert J. Gordon, the well-known macroeconomist, conducted by Emmanuel De Veirman and me. Professor Gordon has written extensively about inflation dynamics and the measurement of prices (among many other things). In the interview, Professor Gordon offers some interesting insights into how the inflation process works in modern economies, how macroeconomic research on inflation has developed, and some of the challenges currently facing monetary policy.

In this edition, we also present an article by Chris Hunt discussing how the current financial market turmoil has origins in world macroeconomic dynamics. He looks at the role of the very large international flows of funds from many emerging markets running current account surpluses, to advanced economies running current account deficits. These large flows led to an abundant supply of credit worldwide, and a consequent substantial reduction in the price of credit, from about the beginning of this decade – a reduction that has since come to a self-generated and abrupt reversal with the credit market disruptions.

Our final article, by Doug Widdowson and Andy Wood, explains credit ratings and their role in the financial system. Credit ratings are simple risk measures that can assist investors to make investment decisions, but they also have limitations. The article highlights some of the key issues that investors should be aware of when using credit ratings.

Many thanks to those of you who responded to the readers' survey we released with the June *Bulletin*. From your responses, we gained useful insights into what you want to see in the *Bulletin*, and how you want it presented. In the December edition, we will provide a brief report on the survey findings and what we intend to do as a result.

I hope you enjoy the range of articles in this edition.

Tim Ng
Editor

 **RESERVE
BANK**
MUSEUM

The Reserve Bank Museum celebrates and records New Zealand's economic and banking heritage.

Displays range from timelines and interactive exhibits to comprehensive display panels outlining both the Reserve Bank's history and role, and how the New Zealand economic system has developed.

Artefacts include the only working example in New Zealand of the MONIAC hydro-mechanical econometric computer developed by New Zealand economist and inventor Bill Phillips in the late 1940s.

In early 2008, the museum received its 10,000th visitor.

The museum is open 9.30 a.m.–4.00 p.m. weekdays. It is closed weekends, public holidays, and for special events. Please call to confirm opening hours.

Reserve Bank Museum
2 The Terrace
Wellington
New Zealand
ph 04-471-3682
museum@rbnz.govt.nz
<http://www.rbnz.govt.nz/about/museum/2766074.html>



Photography by Stephen A'Court.

ARTICLES

Flexibility and the limits to inflation targeting

Alan Bollard and Tim Ng

This article reproduces the paper for a speech given by Governor Alan Bollard on 30 July 2008. We argue that New Zealand's flexible inflation-targeting framework serves the economy well, but one should not to ask too much of it. Inflation targeting is the best approach New Zealand and many other similar countries have yet found for monetary policy, among a limited number of viable alternatives. The fact remains that the New Zealand economy is subject to powerful forces, and monetary policy can only do so much to buffer the shocks. When shocks are persistent, as with oil and food prices currently, it is difficult to judge the appropriate response. Monetary policy needs to allow the initial price changes to occur, but be firm enough to ensure that generalised second-round inflation effects do not take hold. The clear medium-term objective of 1-3 percent inflation helps to anchor inflation expectations, and gives us more scope to accommodate short-term inflation shocks while ensuring that the price stability objective is not undermined in the process.

Introduction

The New Zealand economy, like many others around the world, is going through a tough time. The cost of living is rising and there is a risk of persistent inflation emerging. However, there is also a broad and quite rapid slowing under way in retail spending and the housing market. The extraordinarily large and persistent rise in international oil prices has made New Zealand poorer – it now costs us more to produce and to consume, and the economy needs to adjust to that. This is a difficult combination of influences not seen since the oil shocks of the 1970s.

On the positive side, food commodity prices are also generally going up and this has benefited our dairy sector in particular. There is some evidence that international meat prices are now on the move upwards also.

To add complication, financial markets and banking systems around the world remain very unsettled. Credit markets worldwide began malfunctioning following the US sub-prime crisis, and have not yet returned to normal. Risk aversion remains widespread. Indeed, some people think the credit situation will get worse before it gets better.

The New Zealand dollar exchange rate has fallen somewhat in response to these domestic and international pressures. On a trade-weighted basis, the exchange rate remains at high levels, but there are big differences in the level of the dollar against particular currencies. We are at historical highs

against the US dollar and the Japanese yen, but well below average against the Australian dollar – and almost exactly historically 'normal' against the euro and the British pound.

These are strong influences, and they tug in many different directions. Through all this, the Reserve Bank's task of maintaining price stability is a difficult one. Many other central banks are facing similar challenges. In New Zealand, we are arguably starting from a relatively good position, in that interest rates have been at firm levels and restraining inflation pressure for some time, and have room to fall in response to the weakening economy and abatement of the inflation pressure. For some other countries, growth is set to weaken markedly while inflation concerns remain, but real interest rates are already low or negative.

In this speech, I would like to put current circumstances in the context of the internationally accepted inflation-targeting framework for monetary policy, as applied in New Zealand. I want to ask the question: although the framework has stood the test of time – almost 20 years and counting – is it up to the challenges we face now? I will start by affirming that price stability is the best contribution monetary policy can make to economic growth and prosperity. Overall macroeconomic stability, however, also depends on a sound overall government policy framework that does not itself contribute to economic fluctuations. It also depends strongly on what is happening beyond our borders, with foreign demand and foreign interest rates.

And, this is one of those times that shows that the New Zealand economy is subject to powerful external forces. Monetary policy can only do so much. The challenge for us is to be flexible in buffering these forces as they hit the economy, without undermining public confidence in our commitment to price stability. In some cases – such as the rise in oil prices – we need to make difficult judgements about how best to look through unavoidable near-term inflation spikes, while ensuring that inflation returns to target over the medium term. All of this is consistent with and envisaged by the Policy Targets Agreement.

I'm going to conclude that the framework does work relatively well, and is the best approach we and many others have yet found, among a limited number of viable alternatives. Of course, we continue to seek improvements to it. But overall, although current circumstances are indeed very difficult, the framework, and our interest rate decisions to date, position us well to take on the difficult challenges that we face in the years ahead.

Back to basics: the role of price stability in macroeconomic policy

It is now universally accepted that price stability is a cornerstone of modern, well-functioning economies. Inflation is costly in a social justice sense, because it arbitrarily redistributes wealth among different groups in society. Not only does inflation blunt the link between effort and reward, it typically hits hardest those who can least afford it.

Inflation is also costly because it obscures the relative price signals that must come through clearly if the economy is to adapt to change and make the most of opportunities for growth. At present, high oil prices should be encouraging energy efficiency and alternative fuels development. High dairy prices should shift land use towards dairy production. An environment of stability in the general level of prices helps these signals come through so that the right consumption, investment and other business decisions are made.

It is also generally accepted that maintaining price stability is the best contribution that monetary policy can make to help an economy realise its maximum sustainable growth rate.

The maximum rate itself depends on the microeconomic decisions of individual households, businesses, savers and investors responding to myriad price signals and opportunities for technological improvement. Good monetary policy is about promoting, through price stability, a stable background for these decisions. Other elements of economic policy that also contribute to good decision making and stability include fiscal prudence, the rule of law, and a regulatory framework that does not introduce economic distortions.

Wide-ranging evidence and research in New Zealand and abroad establishes three key lessons about the interaction of growth and inflation. First, that there are many determinants of the long-run level of economic growth. The level of inflation (let alone inflation targeting) is not the only thing that matters. Second, to try persistently to promote growth with loose monetary policy will in all likelihood simply generate a higher level of inflation, which will damage growth prospects in the long term. Third, a monetary policy that loses sight of the importance of price stability will probably contribute to large economic cycles, as inflation gets out of hand and then needs to be reined in with an economic crunch.

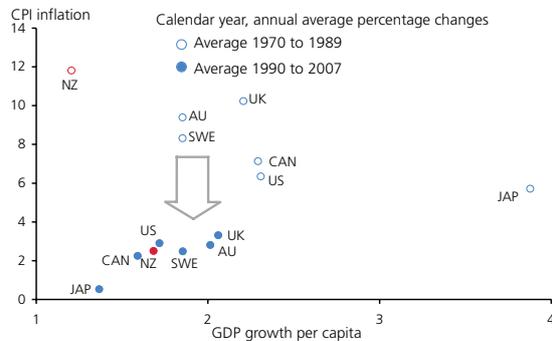
Figures 1 and 2 show that New Zealand actually illustrates the second lesson most clearly, compared to many other countries. In our case, lower inflation has been associated with a higher level of GDP growth per capita. We should not forget that this decade we have enjoyed the longest stretch of continuous growth since comparable records began.

The figures show the experience of a number of other OECD countries in reducing inflation from the high levels of the 1970s and 1980s to the low levels of the past couple of decades. All except the US and Japan have followed New Zealand in becoming inflation targeters.

That the determinants of growth are complex is illustrated by Australia, the UK and Sweden lowering their levels of inflation without much difference in growth, and the US and Canada having lower growth in the low inflation period. Japan had much lower growth in the low inflation period, but this reflects that Japan's low inflation period was one where the Japanese central bank was persistently but

unsuccessfully trying to stimulate the economy, rather than a deliberate effort to hold inflation very close to zero.

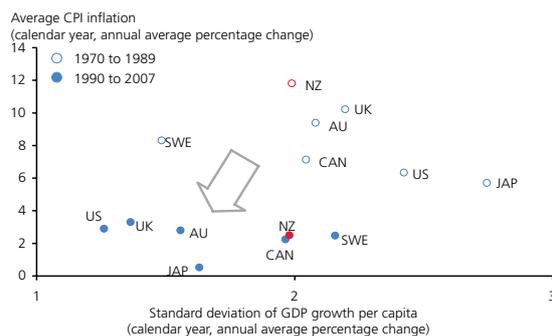
Figure 1
Inflation and average GDP growth per capita, selected OECD countries



Sources: Statistics NZ, DataStream, Statistics Sweden, Government of Japan Cabinet Office. Country key: AU Australia, CAN Canada, JAP Japan, NZ New Zealand, UK United Kingdom, US United States, SWE Sweden.

As for growth volatility, in all cases except Sweden, lower inflation has been associated with less volatile per capita growth performance - though the difference is only slight in New Zealand's case (Figure 2).

Figure 2
Inflation and volatility of GDP growth per capita, selected OECD countries

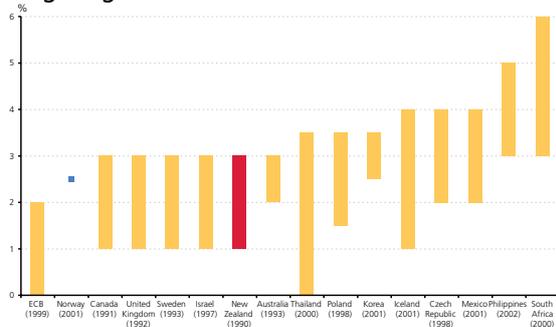


Sources: Statistics NZ, DataStream, Statistics Sweden, Government of Japan Cabinet Office. Country key: AU Australia, CAN Canada, JAP Japan, NZ New Zealand, UK United Kingdom, US United States, SWE Sweden.

The international inflation-targeting framework, New Zealand style

A target in terms of the rate of CPI inflation is now a mainstream way of expressing a commitment to price stability in terms of a measurable statistic. In fact, inflation targeting is one of New Zealand's successful exports. Since New Zealand's adoption of inflation targeting following the Reserve Bank of New Zealand Act 1989 (the Act), over 20 countries have followed.¹ Some of these are shown in Figure 3. Many of those who began inflation targeting relatively early are, like New Zealand, open economies with floating exchange rates. Quite a few of them are also, like us, small and strongly influenced by the prices of commodities on international markets. The list includes both developed economies and emerging economies, from the West and from the East. This long, growing and diverse list of economies suggests strongly that inflation targeting is a monetary policy strategy that can handle a wide range of circumstances and shocks.

Figure 3
CPI inflation target ranges, selected countries with date of commencement of inflation targeting



Sources: Roger and Stone (2005), European Central Bank (ECB). The ECB's target is specified as below, but close to, 2 percent.

In our case, Parliament has defined in the Act the framework within which the Reserve Bank must target inflation. As is well known, the Act specifies that maintaining price stability is the Reserve Bank's primary function (section 8). The Act also makes the Reserve Bank operationally independent, but accountable to Parliament and the general public for its operations in pursuit of price stability. Finally, the Act provides

¹ Roger and Stone (2005) provide a comprehensive review of the international experience of inflation

for the specific policy target to be negotiated between the Governor and the Minister of Finance (effectively on behalf of Cabinet). This, of course, is the familiar Policy Targets Agreement (PTA). The Board of the Reserve Bank and Parliament's Finance and Expenditure Select Committee have the formal responsibility for regularly monitoring and evaluating the Reserve Bank's and Governor's monetary policy performance. Of course, we are also informally evaluated by the financial markets, and by everyone else with an interest in monetary policy, on a continuous basis.

Although inflation-targeting countries differ somewhat in their implementation details, the key elements of an inflation target plus independence plus accountability are widely accepted. Even non-inflation-targeting countries, such as the US and Japan, have independence and accountability arrangements that result in their central banks interacting with the public and financial markets in much the same way as in New Zealand. We all regularly review and document the economic outlook, adjust interest rates accordingly, and appear before our empowering legislatures to explain these interest rate decisions and how we intend to ensure that inflation evolves consistent with our targets.

All of this activity reflects that inflation targeting in practice is not as simple as just a target number for CPI inflation, with interest rates going up when inflation goes up and down when inflation goes down. Considerable analysis is involved in deciding when and by how much to move interest rates in response to the forces influencing the economy. We make choices and judgements about the path of inflation we will aim for over the medium term, and what risks need to be taken into account. The judgements are complicated by the lags with which monetary policy acts on the economy, and the uncertainty involved in forecasting.

All central banks are keenly aware of the interaction between monetary policy and output, interest rate and exchange rate volatility. Good monetary policy means being flexible about responding to price and demand pressures in that light.

We place a lot of importance on explaining how we intend to use this flexibility, setting out our analysis and assumptions so that others may evaluate our performance. This is for two

reasons. First, they are what a public agency should do in a democratic society. Second, and just as importantly, regular explanation and clear resolve about price stability help ensure that the public's inflation expectations remain 'anchored' – that is, consistent with ongoing price stability. Anchored expectations make the job of monetary policy easier, and create the room to be flexible in accepting fluctuations in the actual inflation rate. With anchored expectations, such fluctuations will not undermine public confidence that price stability will be maintained over the medium term.

In our case, the numerical target itself, "future CPI inflation outcomes between 1 percent and 3 percent on average over the medium term", incorporates flexibility. The "medium term" is not formally defined, but we normally aim to ensure inflation is within the range in the second half of a three-year forecast horizon.

Other PTA clauses reinforce the flexible approach. Clause 2(a) requires the Reserve Bank to monitor a range of prices. This explicitly ensures that the reference to the CPI does not blinker our view of inflation pressure in the economy – we should look at everything. The use of the CPI reflects that it is readily accessible and understood, and calculated by an independent agency (Statistics New Zealand).

Clause 3(a) recognises that specific prices, such as oil and food currently, will sometimes move a lot, causing CPI inflation to move temporarily away from the target. However, clause 3(b) then says that these circumstances are not reasons to lose sight of the medium-term inflation target.

Finally, clause 4(b) requires that, in pursuing the target, the Reserve Bank should avoid unnecessary volatility in output, interest rates and the exchange rate.

Through these clauses, the PTA provides guidance both to the Reserve Bank and to the general public about what flexibility means. Among other things, it means that we should not be 'trigger happy' in responding to new events, but should use the full width of the target range, in light of the particular shocks that arise. In the absence of a PTA, we would take this approach anyway, because it is good monetary policy practice, but having the PTA express it explicitly is helpful from an expectations point of view.

As Figure 3 shows, all inflation-targeting central banks in developed countries tend to cluster around a fairly narrow range of target numbers very similar to New Zealand's (emerging economies tend to have slightly higher ranges). The lower bound of 1 percent is there because of the danger of deflation, while the upper bound reflects the evidence that sustained inflation above around 3 percent hurts growth. Alan Greenspan said that price stability exists when people do not factor inflation into their decision-making, and research evidence suggests that a numerical target below 3 percent accords well with this idea.

The success in reducing inflation around the world (using inflation targets or otherwise) is probably not all due to better monetary policy, though the evidence suggests that monetary policy played no small part. Beneficial circumstances, including the long period of strong productivity growth in Asia and resulting falling prices of Asia's exported manufactured goods, no doubt helped. Institutional features such as the exact specification of targets probably matter much less than the good conduct of monetary policy – that is, the appropriate use of flexibility.

Dealing with large shocks: flexible inflation targeting in practice

Flexibility requires difficult, but unavoidable, judgements about how best to respond to economic developments as they unfold, but without jeopardising medium-term price stability. Shocks can be big or small, and of a variety of types demanding different treatment. The structure and behaviour of the economy changes, and people learn, over time. Some types of behaviour, such as housing and asset price cycles, can be quite destabilising, in that they tend to generate boom-crash dynamics.

As a result, interest rates move, sometimes by a lot. This is true not just in New Zealand but in other developed economies (inflation targeters and otherwise). Different economies face different pressures at different times, and targets are specified a little differently, but the swings in policy rates over time are similarly large across a diverse range of countries. For example, over this decade to date, the US policy rate fell 6½ percentage points between 2000

and 2004, then rose more than 4 percentage points between 2004 and 2007, and fell again by more than 3 percentage points through to this year.

Unpredicted and temporary price shocks are relatively easy for monetary policy to deal with. By definition, they happen too quickly to respond to anyway, and their short duration lessens the risk that they will destabilise the economy. An example is a sharp rise in fresh vegetable prices due to bad weather, that everyone reasonably expects to be reversed when the weather improves. We look through such shocks, consistent with the PTA's focus on the medium term.

When a shock is persistent, or forecast to evolve over a long period of time (say years), it is much more difficult to judge the appropriate response. A very good current example is oil prices. Over the past four years or so, international oil prices in US dollar terms have quadrupled. Consensus forecasts have consistently failed over this time to give any hint this might happen, as can be seen in figure 4. Though the rising New Zealand dollar over this period has offset the impact on local prices a bit, the impact of the oil price shock on CPI inflation over this time is clear, and it accounts for a large part of why CPI inflation is where it is today.

Figure 4
International oil prices and Consensus projections



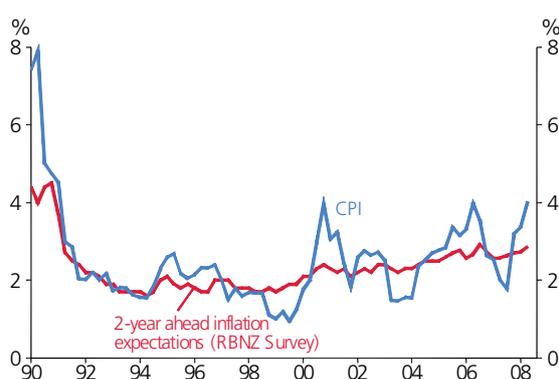
Sources: Datastream, Consensus Economics Inc. Projections are as at June of the year indicated.

In these circumstances, we have real choices about how to respond. We can either let any further anticipated direct inflation consequences of the shock come through, or try to offset them with tighter policy than otherwise.

The PTA does not explicitly address long-lasting shocks, but as noted before, it does provide sufficient guidance

and scope for the Reserve Bank to take a sensibly flexible approach. The basic approach of looking through the near-term, unexpected inflation impact is the same. However, the key judgement with this kind of persistent, high-profile shock is about the heightened risk that the period of elevated headline CPI inflation might lead the public to question the Reserve Bank's commitment to the medium-term inflation target, and plan and act on the basis of a higher expected inflation rate. Getting inflation expectations down again can be very costly, as shown by New Zealand's own economic history – let alone the history of countries that have experienced hyperinflation, such as the Weimar Republic in the 1920s, Argentina in the 1980s and Zimbabwe currently.

Figure 5
CPI inflation and inflation expectations



Sources: Statistics NZ, RBNZ.

There is thus much less scope to be sanguine about long-lasting price shocks compared to sudden and ephemeral shocks, because the risk is greater that inflation expectations could drift away from the target range. Currently, inflation expectations appear to remain anchored at a level consistent with the target range, though there is a slight upward drift, apparently reflecting the sustained elevation of headline inflation (Figure 5). The key requirement in this sort of situation is that policy is kept tight enough to ensure that inflation expectations remain anchored.

Sustained oil price inflation is just one stark example of a shock that might persist for some time. There are actually two other large and sustained shocks all at work on the New Zealand economy at the moment: a retrenching housing market after the biggest housing boom ever, and very strong dairy prices. Also, very large increases in other

commodity prices such as steel and fertiliser, while having a smaller direct effect on CPI, have had a substantial impact on business costs in some sectors.

The appropriate response to the housing market downturn is fairly straightforward, because it is a demand-driven shock. With weak domestic spending, loosening policy to bring demand closer to the economy's supply capacity is also consistent with keeping future inflation on target.

The dairy price shock is more difficult, as it combines a positive stimulus to demand (increased income for dairy farmers and associated industries) with a negative stimulus (the reduction in real household disposable income due to rising prices of dairy products). We need to judge the net effect on demand, and account for the upward risk to inflation expectations from the price increase itself. A complication is that the exchange rate will tend to move in response to the terms of trade effects of the dairy price movement, and spread its impact further around the economy.

The oil price shock is of the most difficult type. For a net oil importer such as New Zealand, it reduces disposable incomes and demand (suggesting looser policy is appropriate), but also has a direct upward impact on inflation and presents upward inflation expectations risks (suggesting tighter policy is appropriate). The exchange rate will respond to the terms of trade movement in this case also.

The overall impact of this mixture of large shocks of different types produces the complicated picture we have at present. Demand is weak, but the economy's supply capacity is under pressure from higher oil and other input prices. On top of these movements in the supply-demand balance, prices are rising. The overall adverse movement in the terms of trade as oil prices have continued to rise, while dairy prices have at least paused, leaves New Zealand poorer. Adjustment to the relative price shock, which in this case is sourced from the fundamentals of supply and demand in international markets, has to occur through a combination of lower real wages and lower real profit margins.

It does not make sense for the Reserve Bank to try to prevent this adjustment. Instead, the key policy requirement in this situation is to allow the initial externally driven relative price changes to occur, but keep monetary policy sufficiently firm

to ensure that generalised second-round inflation effects do not take hold – in other words, to keep inflation expectations anchored.

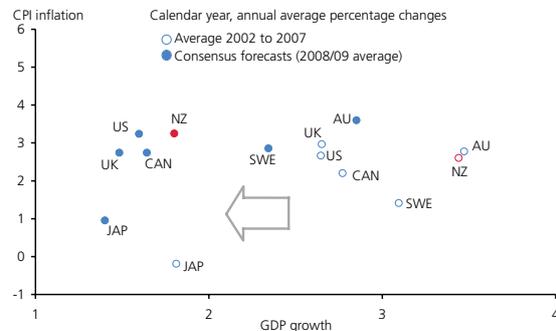
We are already starting from a position of high real interest rates in New Zealand, reflecting the need to restrain inflation pressure that has built up in recent years. Indeed, current headline inflation remains above the target range of 1 to 3 percent (though the CPI excluding food and energy prices is rather lower). However, our judgement at this stage is that the contractionary effects of the housing downturn, high oil prices and the global credit crunch will substantially outweigh the stimulus from high export prices and projected expansionary fiscal policy. We have thus adopted an easing bias in our monetary policy stance. Our judgement is that the weakness in the economy will be sufficient to bring inflation, and inflation expectations, down over the medium term consistent with the target range.

Our starting position is arguably more favourable than that of other economies, in the sense that there is plenty of room for our projected easing in interest rates as the economy and the existing inflation pressure weaken. Most developed economies are facing much the same, very uncomfortable, combination of slowing growth in the presence of rising inflation pressure, but some are still running very low or negative real interest rates. For the year to June, the US reported 5 percent inflation, Australia 4.5 percent, the euro zone 4 percent, and the UK 3.8 percent. The Governor of the Bank of England recently had to write to the UK Chancellor explaining a departure from the Bank of England's target range, making very similar arguments to the ones we have been using for treatment of oil and food price shocks, and warning that worse is to come. To make things worse, for this group of countries and some other developed countries, growth over the next couple of years looks likely to run one or two percentage points below where it has been in the past few years (figure 6).

In some Asian countries, the situation is very difficult indeed, where food in particular forms a much larger proportion of the consumption basket. Singapore's and China's inflation rates are both above 7 percent, and their real interest rates are negative – but monetary tightening is constrained by exchange rate considerations. For the countries shown in

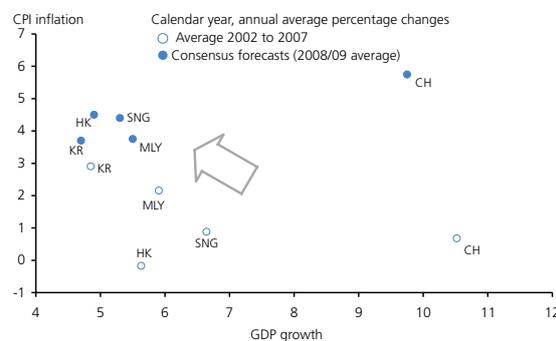
Figure 7, the movement towards high inflation with low growth is quite marked.

Figure 6
Inflation and growth outlook, selected developed countries



Sources: Statistics NZ, DataStream, Statistics Sweden, Government of Japan Cabinet Office, Consensus Economics Inc. Country key: AU Australia, CAN Canada, JAP Japan, NZ New Zealand, UK United Kingdom, US United States, SWE Sweden.

Figure 7
Inflation and growth outlook, selected Asian countries



Sources: Datastream, Consensus Economics Inc. Country key: CH China, HK Hong Kong, KR Korea, MLY Malaysia, SNG Singapore.

The challenges for inflation targeting

Independence and accountability arrangements for central banking have an unattractive flipside in that they can lead to heightened expectations of what monetary policy is actually able to achieve. Inflation targeting is not an elixir for stabilisation.

The current very large international forces remind us that small economies like New Zealand are especially dependent on developments offshore. This decade, the New Zealand

dollar has been very strong, materially complicating monetary policy – due partly to the sizeable gaps that opened up at various times between our interest rates and those in some other countries, including Japan, the US and Switzerland. Rising commodity export prices have also played a role. There is little we can do about other countries' interest rates or international commodity markets. To state the obvious, we run New Zealand's monetary policy according to New Zealand economic conditions, and other central banks run their monetary policies according to their own economic conditions. The Australian dollar has also strengthened markedly in the past two or three years, largely reflecting similar factors.

Dealing with asset price cycles and their consequences for price stability is another issue that central bankers across the world are grappling with. Housing market booms occurred this decade not only in New Zealand, but also the UK, Australia and the US. The aftermath of these booms is still playing out currently in New Zealand, the UK and the US at least.

On the positive side, there are things that can be done to enhance the environment within which monetary policy operates. These include a wider government policy framework that at least does not contribute to the cyclical nature of the economy, and to the tendency for inflation shocks to become entrenched. Even better are government policies that reduce cyclical nature – such as the well-known 'automatic stabiliser' features of well-designed fiscal policy frameworks. Although economic stabilisation is not the primary motivation for these other policy areas, we do work with other government agencies to try to enhance the stabilisation properties of government policy where possible, including reducing structural distortions that tend to generate economic cycles.

These issues motivate us to continue to look for other instruments that might support the Official Cash Rate (OCR) as tools to promote macroeconomic stability. We also look forward to the findings of the Finance and Expenditure Select Committee's Inquiry into the Future Monetary Policy Framework. In both the Supplementary Stabilisation Instruments work we did in 2006 and in our submission to the Committee's Inquiry, we reported that there did not

appear to be any magic bullets among the range of potential instruments considered. Having said that, we did find that certain adjustments to tax and other regulatory structures might reduce their contribution to the cyclical nature of the economy. Analysis of the other instruments and approaches suggested they would either be ineffective in the long run, or introduce large economic distortions.

As noted earlier, the differences in central bank mandates, inflation targeting frameworks and monetary policy conduct across countries are not large enough to explain the differences in long-run growth performance we observe. Savings, investment and average interest rate patterns reflect the long-running fact that New Zealanders remain willing to borrow and spend at much higher interest rates than those prevailing in other countries. Conducive policy frameworks, including sound monetary policy, help maximise long-run growth performance and prosperity. However, what is also needed is savings and investment behaviour geared towards growth.

Despite spending time looking, we have found no clearly superior alternatives to the flexible inflation targeting approach to maintaining price stability. Such things as monetary targeting and fixed exchange rates have been tried before in New Zealand, as in other countries that are now inflation targeters. Both monetary and exchange rate targeting regimes tend to be very inflexible. They require the burden of many types of shocks to be forced through output, rather than absorbed by the policy instrument itself, and tend to be most suitable for situations where inflation expectations are poorly anchored and the commitment of the central bank to price stability is doubted by the public.

Another alternative that could appear superficially attractive is to require monetary policy to target multiple objectives such as growth, employment, export and the balance of payments. This was the approach taken in New Zealand and many other countries in the post-war period up to the early 1980s. It inevitably had a short-term focus, and resulted in stop-go policies and high inflation. We now know that one instrument cannot succeed in achieving multiple objectives over the cycle. The move to inflation targeting, with its single, clear objective, resulted from the lessons learned in that period. We do not want to re-learn those lessons.

Conclusions

Monetary policy – day to day, month to month and year to year – is about balancing judgements in an uncertain world. It is not a precise tool. Times like the present are particularly challenging, when there are large and persistent shocks on both the demand and the supply sides of the economy.

Nevertheless, we believe the inflation targeting framework provides us sufficient flexibility to deal with the short-term consequences of shocks, without losing sight of the essential medium-term inflation objective. The New Zealand framework and approach is very much like that used in other economies. The next few years will not be easy, but I believe that the framework is the best available, and that the Reserve Bank is up to the challenge of applying it flexibly.

Overall, the framework has been relatively successful. Despite the current shocks we are going through, we expect inflation and inflation expectations over the medium term to be within the target band. The public expects us to meet our target, and this helps to keep expectations anchored.

Very few of the countries that have adopted inflation targeting have given it up. Alternatives that dilute the focus on medium-term inflation and price stability could seriously threaten the anchoring of inflation expectations and damage the credibility of the New Zealand macroeconomic policy framework, especially in the current environment of high rates of headline inflation and strong forces on the economy.

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Inflation in New Zealand's trading partner economies

Satish Ranchhod¹

Inflation pressures in other economies have important implications for inflation, activity and monetary policy in New Zealand. This article examines inflation trends in New Zealand's trading partner economies over the past decade. Looking at a range of inflation measures, we observe that the low inflation seen in our trading partner economies in the mid-1990s has now given way to a period of higher inflation. Increases in inflation rates have been seen in all regions, with particularly notable increases in Asian economies.

Higher inflation in our trading partner economies has been related to strength in global growth and the closer integration of Asia and emerging markets into the global economy. These developments have contributed to increased demands on productive resources and strong growth in commodity prices. Such increases have been reflected in higher consumer prices and export prices in our trading partner economies. In New Zealand, these developments have contributed to a more challenging environment for monetary policy, with stronger consumer price inflation and increased headwinds for growth.

1 Introduction

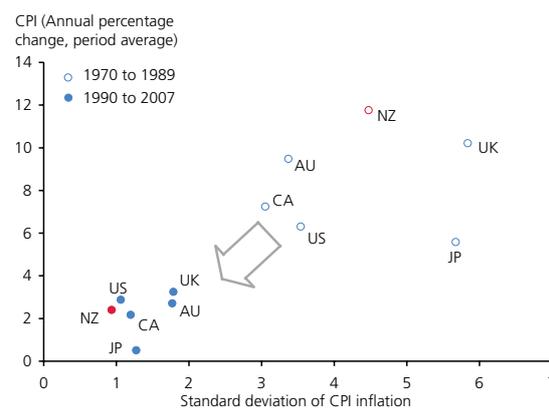
Inflation is ultimately a monetary phenomenon. In recent decades, the successful implantation of monetary policy aimed at price stability has contributed to marked declines in the level and variability of inflation in New Zealand and other developed economies (figure 1). Policy-makers' preferences for low inflation have also contributed to an improvement in inflation outcomes in Asian economies since the early 1990s. But while monetary policy and the preferences of policy-makers will determine an economy's long-run rate of inflation, in the short run inflation can be influenced by a range of factors such as the strength of global activity. Such short-run influences can have important implications for activity and monetary policy, particularly in small open economies such as New Zealand. This article examines inflation in other economies over the past decade, focusing on the increases seen in inflation since 2004. It considers the factors that have contributed to these increases, as well as the implications for prices and activity in New Zealand.

Previous work at the Reserve Bank of New Zealand has also examined such short-run inflation influences. When looking at global inflation, Hunt (2007) found the increased

Figure 1

Inflation and inflation volatility

(selected trading partners, 1970 to 2007)



Sources: Statistics NZ, DataStream, Cabinet Office (Government of Japan).

Country key: AU Australia, CA Canada, JP Japan, NZ New Zealand, UK United Kingdom, US United States.

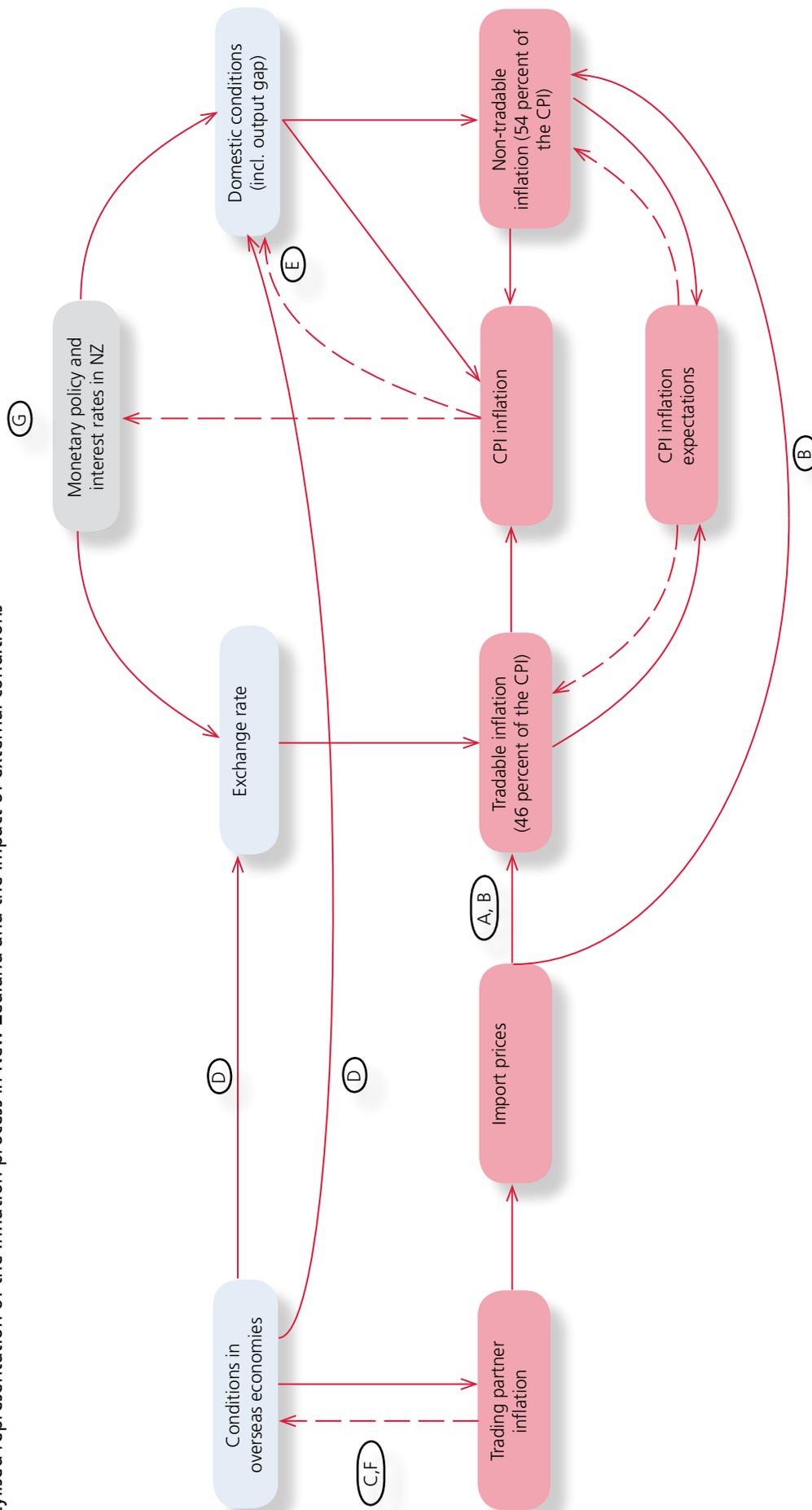
integration of Asia and emerging markets into the global economy had helped to dampen global inflation pressures in the mid-1990s, but that this effect appeared to be dissipating. Hodgetts (2006) looked at changes in New Zealand's inflation process. This work found that increased trade with Asia and emerging markets has been one factor that has helped to dampen inflation pressures in New Zealand since the 1990s.²

¹ Thanks to staff at the Reserve Bank of New Zealand for their comments and assistance with the preparation of this article. Thanks also to Justin Fabo (RBA), Duncan Wooldridge (UBS) and Amy Tang (UBS) for their assistance with the data for this project.

² Hodgetts (2006) notes that the adoption of inflation targeting and the anchoring of inflation expectations have been the main reasons for New Zealand's improved inflation performance.

Figure 2

Stylised representation of the inflation process in New Zealand and the impact of external conditions³



³ Figure 2 provides a stylised description of New Zealand's inflation process. It does not purport to capture every possible influence on inflation. For instance it does not distinguish between real and nominal interest rates or exchange rates. Drew and Sethi (2007) provide a more detailed description of the monetary policy transmission mechanism in New Zealand.

This article complements the work of Hunt and Hodgetts by looking at a range of inflation measures and accounting for more recent development in New Zealand and abroad. We observe that the benign inflation pressures other economies had been experiencing have now dissipated, with global inflation creeping upwards since 2004. This increase has been associated with strength in global economic activity, particularly in Asia and emerging markets. Strength in activity has contributed to higher commodity prices and rising costs of production in many regions.

Increases in global inflation have contributed to a more challenging environment for monetary policy in New Zealand, adding to domestic inflation pressures while dampening domestic activity. In this environment, the Reserve Bank of New Zealand remains focused on our medium-term inflation goals and ensuring inflation expectations remain anchored.

The article is structured as follows. Section 2 discusses why we are concerned about inflation in other economies. Section 3 examines inflation developments in our trading partner economies, looking at a range of inflation measures. Section 4 examines what has contributed to the changes in inflation over the past decade. Section 5 considers the implications of recent developments for the New Zealand economy. Section 6 concludes.

2 Why do we care about inflation in other economies?

Prices changes in other economies affect the New Zealand economy via a number of channels. Among the most important are the impacts on inflation and activity. Inflation in other economies is also an important consideration for monetary policy, both in New Zealand and in other economies. Figure 2, previous page, provides a stylised description of these channels.

Impacts on domestic inflation

Price increases in other economies directly affect inflation in New Zealand if prices for imported finished goods rise as a

result (this is channel A in figure 2).⁴ With 46 percent of New Zealand's consumers' price index (CPI) made up of tradable goods and services (i.e., goods and services that tend to be imported or compete against imports), the effect of such increases on consumer prices can be large.

Additionally, as a large proportion of intermediate goods is imported, inflation pressures in other economies can also affect prices in New Zealand indirectly (channel B). Indirect pass-through occurs when higher prices for productive inputs result in higher prices for final goods and services produced in New Zealand. For instance, higher international prices for oil can result in higher domestic prices for petrol (the direct effect of an oil price increase). They can also result in higher prices for transportation services (e.g., higher taxi fares) and higher prices for goods that rely on transportation services such as freight (e.g., grocery items). Indirect effects can be large (Delbrück, 2005) and may be seen in prices for both tradable and non-tradable goods.⁵

Impacts on activity

Inflation in our trading partner economies can influence the level of activity in New Zealand. For instance, if inflation increases in other regions, this can constrain household spending in those regions (channel C), potentially reducing their demand for New Zealand's exports (channel D). At the same time, higher imported inflation in New Zealand can constrain consumers' real purchasing power, resulting in reduced demand for both imported and domestically produced goods (channel E).

Inflation pressures in other economies will also affect interest rates and the stance of monetary policy in those regions (channel F). In turn, this can have implications for the strength of demand for New Zealand's exports due to the effects of foreign monetary policy on foreign demand and exchange rates.

⁴ The precise nature of pass-through from overseas inflation pressures to prices in New Zealand would also be affected by a range of factors including exchange rate movements, import substitution and the strength of domestic activity.

⁵ Non-tradable goods and services are those that are produced domestically and that do not face strong competition from imports.

Impacts on the stance of monetary policy

The impact of inflation in other regions on New Zealand cannot be separated from the stance of monetary policy in New Zealand. The Reserve Bank of New Zealand's focus on headline inflation means that we must balance developments in the prices of tradable goods against inflation pressures stemming from the non-traded sector. If inflation in imported goods/the traded sector increases or decreases, this can affect the level of domestic activity and non-tradables inflation that is consistent with our overall inflation aims, at least over short periods (Bean, 2006).⁶ The response of monetary policy to such conditions (channel G) will ultimately determine the level of inflation in New Zealand and can also influence the level of domestic activity.⁷ Consequently, it is not necessarily the case that New Zealand will experience higher (or lower) inflation simply because inflation in our trading partner economies increases (or decreases).

3 What has happened to prices in other economies?

In this article, we examine a range of measures to develop a broad understanding of how inflation in our trading partner economies has evolved. The measures we look at are:

- CPIs – these measure the cost of the basket of goods purchased by the 'average' household in an economy.
- Producer price indices (PPIs) – these measure the prices for goods produced by firms and can be informative

when assessing cost pressures in an economy that affect domestic prices and export prices.

- Export prices in other economies – such prices are relevant when examining how inflation pressures in other regions pass through to inflation and activity in New Zealand.

Across all of the measures examined, there has been an acceleration in inflation in our trading partner economies since 2004.⁸ This acceleration has been largest in our main trading partner economies in Asia, excluding Japan (AxJ), but inflation in developed economies has also accelerated.^{9,10} Table 1 provides a summary of inflation rates by region and time period.

Table 1
Trading partner inflation measures¹¹

	1997 to 2003	2004 to 2007	Change
Consumer prices			
All regions	1.6	2.4	+0.8
Developed econs.	1.6	2.2	+0.7
AxJ	1.1	2.9	+1.8
PPIs			
All regions	0.5	3.8	+3.2
Developed econs.	0.6	3.6	+2.9
AxJ	0.5	4.4	+3.9
Export prices			
Developed econs.	-0.5	2.5	+3.0
AxJ economies			
Hong Kong	-2.1	1.4	+3.5
Singapore	-2.4	0.2	+2.6
Korea	-5.4	3.1	+8.5
Taiwan	-0.5	1.3	+1.9

Sources: RBNZ estimates, DataStream, national sources.

⁶ For instance, Bean (2006) notes that favourable changes in import prices can allow an economy to operate at a higher level than would otherwise be consistent with price stability aims. However, Bean goes on to note that this is unlikely to be sustainable for prolonged periods.

⁷ While monetary policy can influence the level of growth in the short term, in the longer term an economy's maximum sustainable rate of growth is determined by a range of factors. These include decisions by households and firms (particularly those related to investment), technological developments and the regulatory environment. However, appropriate monetary policy can ensure a more favorable environment for longer-term growth via the pursuit of price stability (Bollard and Ng, 2008).

⁸ The presence of structural breaks around 2004 in the inflation series examined was confirmed using Chow's break point test.

⁹ New Zealand's major trading partners in AxJ are China, Hong Kong, Malaysia, Singapore, Korea and Taiwan. When examining inflation in AxJ, we focus on these economies.

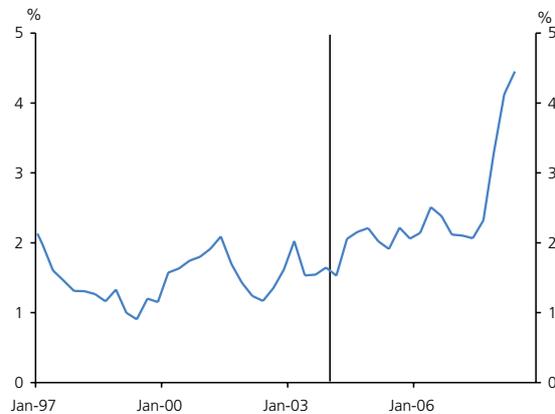
¹⁰ The developed economies examined are the US, UK, Eurozone, Canada, Japan and Australia.

¹¹ When examining consumer price inflation in Australia, we have used data from the Reserve Bank of Australia that removes the impact of GST being introduced in 2000.

Trends in consumer prices

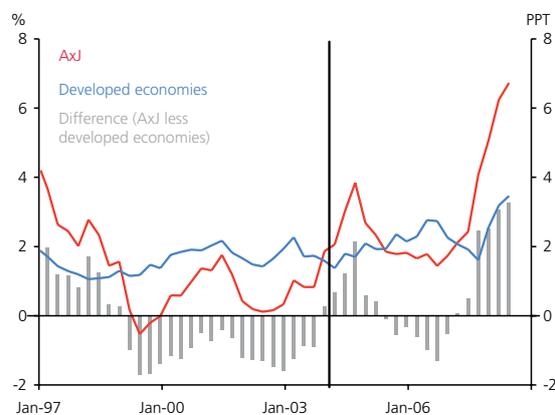
Since 2004, consumer price inflation in our trading partner economies has gradually trended upwards (figure 3). In recent years, these increases have been exacerbated by large increases in prices for food and fuel. Consumer prices have also been pushed up by the indirect effects of higher prices for commodities (though, as discussed later, these are not the only factors that have contributed to higher prices).

Figure 3
Consumer price inflation
(weighted average of trading partners, annual percentage change)



Sources: RBNZ estimates, DataStream, RBA.

Figure 4
Consumer price inflation by region
(weighted average of trading partners, annual percentage change)



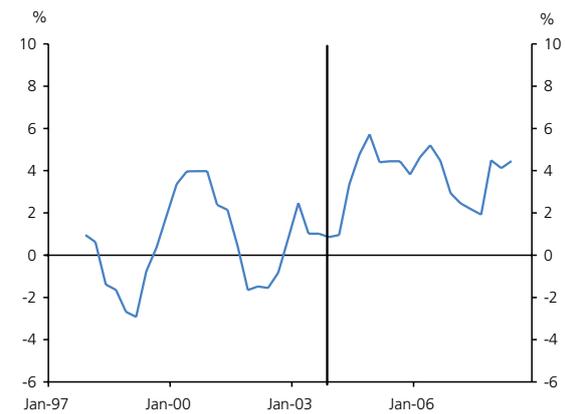
Sources: RBNZ estimates, DataStream, RBA.

Increases in consumer price inflation have been particularly large in AxJ economies. This has occurred at the same time as New Zealand's trade with AxJ has increased significantly (AxJ's share of New Zealand's imports has risen from 13 percent in 1997 to 29 percent at the end of 2007). Inflation rates have also risen in other economies, but such increases have been more modest.

Trends in producer prices

In addition to increases in consumer prices, our trading partner economies have experienced pronounced increases in PPI inflation since 2004 (figure 5). This growth in producer prices has been similar across developed economies and AxJ (figure 6). In part, this reflects that many of our trading partner economies have faced similar increases in imported input costs in recent years, particularly for commodities (inflation in producer prices will also be determined by domestic conditions).¹² Such increases in production costs are likely to have contributed to the increases in other inflation measures seen in all of the regions examined.

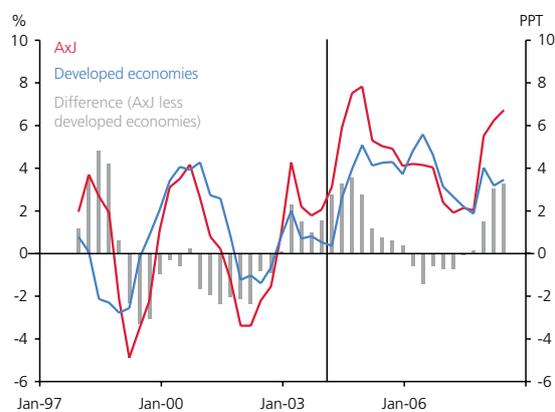
Figure 5
Producer price inflation
(weighted average of trading partners, annual percentage change)



Sources: RBNZ estimates, DataStream.

¹² Besley (2007) makes a similar finding when looking at consumer prices. He notes that higher prices for commodities (including energy and food) have been a significant contributor to the similarities in inflation trends in economies such as the UK, Eurozone, US and China in recent years.

Figure 6
Producer price inflation by region
(weighted average of trading partners, annual percentage change)



Sources: RBNZ estimates, DataStream.

Trends in export prices¹³

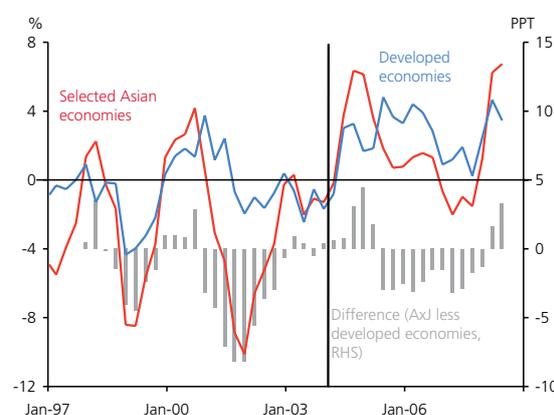
Recent years have also seen an acceleration in export price inflation in both developed economies and in AxJ. As with consumer prices, increases in export price inflation have been largest in AxJ economies, which have shifted away from 'exporting deflation' as they tended to do in the mid-1990s and early 2000s (figure 7). Nevertheless, from table 1 we see that export price inflation in AxJ economies still tends to be low compared to that in developed economies. Further, developed economies, from where the majority of New Zealand's imports are sourced, have also shifted away from exporting deflation since 2004 (figure 8).

While the average rate of export price inflation has increased in AxJ, there is some uncertainty about what has happened to export prices from China, our second-largest market for imports. Data from the Chinese National Bureau of Statistics indicate that export price inflation in China has accelerated sharply in recent years, but these data are only available from 2005. Indirect indicators of Chinese export prices based on import prices in other economies tell a mixed story. On balance, it seems likely that the rate of Chinese export price inflation has increased in recent years, particularly given strong increases in costs of production. However, even

¹³ Hunt (2007) notes that the shift in China's exports to high-quality and higher value-added products may mean that export prices tend to overstate quality adjusted price movements in China. This may also be a concern when examining inflation in other parts of Asia.

if the rate of Chinese export price inflation has increased, it may still be modest.

Figure 7
Export price inflation by region
(annual percentage change)



Sources: RBNZ estimates, DataStream, Bank of Korea.

Note: The Asian economies examined in figure 7 are Hong Kong, Singapore, Korea and Taiwan. Data for other economies in AxJ was not available.¹⁴

4 What has contributed to the trends seen in inflation?

As noted earlier, inflation is ultimately a monetary phenomenon. But in the short run, it can be affected by a range of factors. To examine the near-term factors that have contributed to the increases in inflation in our trading partner economies, it is useful to look first at the factors that contributed to lower inflation before 2004. This is because some of the same factors that previously contributed to lower inflation have evolved and are now contributing to higher inflation.

¹⁴ In 1997, Korea shifted to a floating exchange rate. This saw a large decline in the Korean won and a large increase in won-denominated export prices. Because of this structural break, won-denominated export prices are not suitable for this examination. Instead, we have used foreign currency-denominated export prices, which the Bank of Korea describes as being "impervious to exchange rate fluctuations" (Bank of Korea, 2008). Movements in foreign currency-denominated export prices and won-denominated export prices are similar except around the time the won was floated.

The mid-1990s and early 2000s

In addition to policies targeting price stability, two key contributors to subdued rates of inflation seen in the mid-1990s were 1) impacts of globalisation and 2) the state of global economic activity.¹⁵

1. The IMF (2006) has described globalisation as “the acceleration in the pace of growth of international trade in goods, services, and financial assets relative to the rate of growth in domestic trade.” During the 1990s and early 2000s, this process dampened inflation pressures via a number of channels. Among the most significant was the increased integration of Asia and emerging markets into the global economy. Reduced trade barriers allowed many economies access to lower-cost imported goods from emerging markets. At the same time, inflation pressures were also dampened by the effective increase in the global labour force, as well as increased competitive pressures in many markets associated with increased trade openness.¹⁶ Pain *et al.* (2006) estimate that the effect of these developments may have reduced inflation in OECD economies by around 0.2 percentage points. In emerging markets, the IMF (2006) found that increased trade openness increased the probability of ‘low’ inflation.¹⁷
2. Inflation pressures are closely linked to the strength of activity in an economy relative to its level of productive

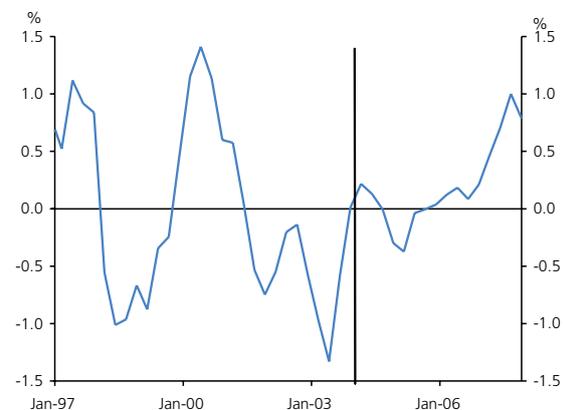
¹⁵ While globalisation may have dampened global inflation pressures, its impact on inflation rates may not be large in all economies. For instance, Feyzioglu and Willard (2006) find the prices in China have only a small and temporary impact on prices in the US and Japan. Further, Mishkin (2007) reviews several of the channels through which globalisation may affect inflation and notes its impact may not be large.

¹⁶ The increased integration of emerging markets into the global economy has effectively doubled the global labour supply (Bean, 2006). This has been reinforced by increasing urbanisation of populations in emerging markets. Such changes can affect inflation pressures in developed economies via increased competitive pressure in labour markets and via activities such as off-shoring (Hunt, 2007). The IMF (2006) notes that a moderation in unit labour cost inflation was seen over the 1990s.

¹⁷ IMF (2006) defined low inflation in emerging markets as an inflation rate of less than 10 percent per annum. After accounting for factors such as monetary policy credibility and exchange rate regimes, the IMF found that increased trade openness increased the probability that an economy would experience low inflation by around 10 percent.

resources. This measure of capacity utilisation is frequently referred to as the output gap. When economies are growing slowly relative to their potential or trend rates of growth, resource utilisation tends to be low (i.e., the output gap tends to be negative). At such times, demands on resources ease, indicating a corresponding reduction in inflation pressures. Between 1997 and 2004, there were two periods where there was a material easing in activity in our trading partner economies and when the world output gap turned negative (figure 8). The first was related to the Asian financial crisis in 1997–1998. The second in 2001–2002 was associated with the bursting of the dot com bubble and related sharp fall in equity markets. During this latter period, global growth and confidence was also affected by 2001’s terrorist attacks in the US, the emergence of SARS and disruptions to investment cycles related to Y2K concerns (RBNZ, 2007). These slowdowns were particularly pronounced in Axi economies (figure 9) and have been linked to demand-related easing in import and commodity prices (HSBC, 2008). During these periods, declines in import prices had sizeable effects on consumer price inflation.¹⁸

Figure 8
World output gap
(weighted average of New Zealand’s main trading partners)

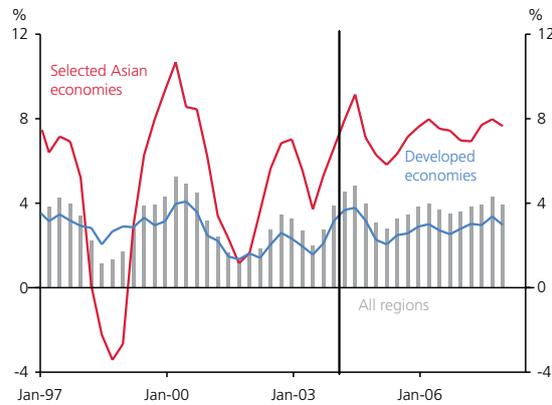


Source: RBNZ estimates.

¹⁸ IMF (2006) found that during the slowdowns noted above, declines in import prices took more than 1 percent off inflation in some advanced economies.

Figure 9

Trading partner GDP
(annual percentage change)



Sources: RBNZ estimates, DataStream.

Post-2004

Since 2004, we have observed stronger inflation in our trading partner economies across all of the measures examined. A key contributor to this has been the strength of global activity. From figure 9, we see that between 2004 and 2007 our trading partners experienced relatively firm growth. Notably, AxJ experienced more consistent growth than it did between 1997 and 2003. Sentance (2007) highlights three key factors that contributed to this strength in global activity.

- First is monetary policy, which adopted a more stimulatory stance in many economies in the early part of this decade in response to weakness in demand. For instance, in the US the Federal Funds Target Rate was reduced from 6.5 percent in 2000 to just 1 percent in 2003.

Policy-makers in Asia also adopted a more supportive stance around this time as they attempted to insulate their economies from the volatility the region had experienced during the financial crisis of 2001. To accomplish this, exchange rates and interest rates were kept artificially low, contributing to increases in exports and foreign exchange earnings. These policies also helped to stimulate domestic demand.

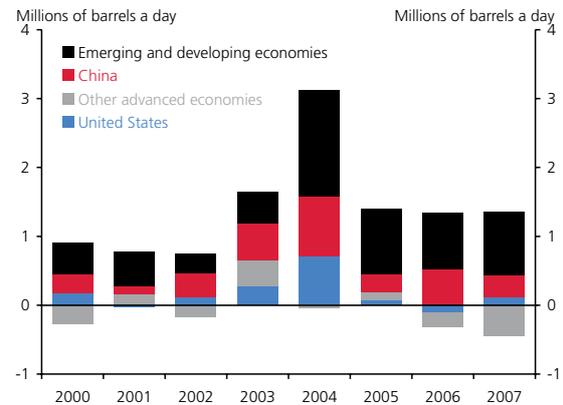
- Second is the liberalisation of financial markets, which has allowed for greater ease in directing funds from those countries with surplus savings into investment in other regions.

- Third is the structural changes in trade patterns related to globalisation and the closer integration of Asia into the global economy.

Of these factors, the third is notable because, as outlined above, globalisation contributed to lower inflation prior to 2004. However, in recent years the inflation-dampening effects of globalisation have started to dissipate. One reason for this is that the robust growth seen in AxJ and emerging markets has resulted in structural increases in demand for resources, particularly fuel (figure 10). As a result, there have been strong increases in the prices for many commodities in recent years (figure 11). Demand from economies in these regions for both hard and soft commodities appears likely to continue growing for some time, as growth in these economies is more energy and commodity intensive than in developed economies (Lipsky, 2008).

Figure 10

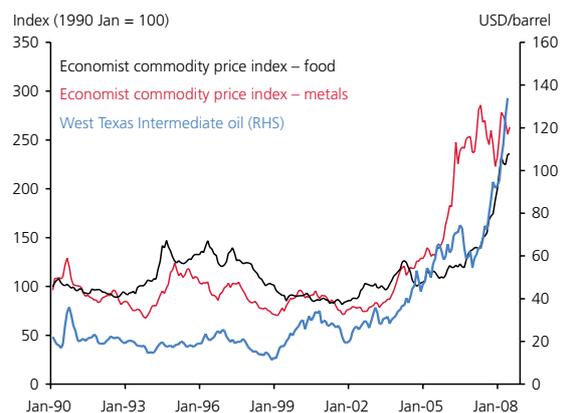
Growth in global oil consumption



Source: IMF.

Figure 11

Commodity prices



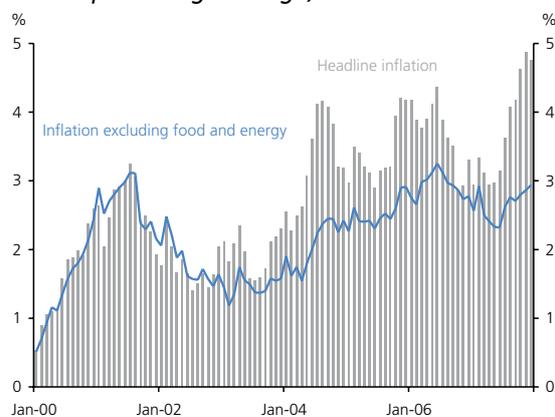
Source: DataStream.

Commodity price increases contribute to higher global inflation via direct increases in consumer prices (e.g., higher prices for vehicle fuels). They also add to inflation pressures via the indirect channels discussed earlier. This is of concern for New Zealand, as the impact of higher commodity prices will be felt in all regions that import commodities, not just in those that have experienced increases in demand. This includes developed economies that are sources for the majority of our imports.

In addition to the effects of higher commodities prices, strength in global activity has added to inflation via increased demands on productive resources. The firm growth in the global economy in recent years has seen the world output gap rising to elevated levels (figure 8) with a corresponding increase in inflation pressures. This has been seen most clearly in AxJ, where inflation has risen to elevated levels even excluding the direct effects of higher food and fuel prices (figure 12). Consumer price inflation excluding food and fuel prices has also risen in developed economies, but these increases have been more modest (figure 13).

Overall, the strength of global activity and the closer integration of Asia and emerging markets into the global economy appear to have been major contributors to recent increases in global demand and cost pressures. The resulting

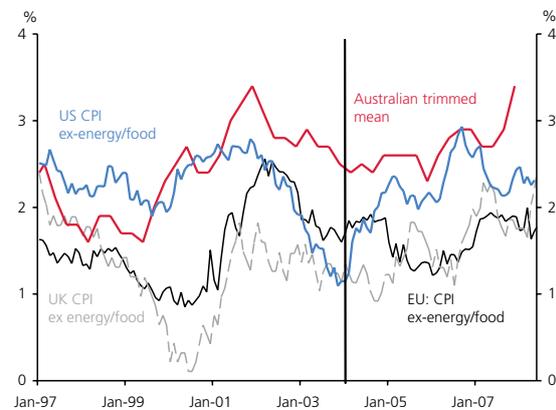
Figure 12
Consumer price inflation in AxJ¹⁹
(headline and ex-food and energy inflation, annual percentage change)



Source: UBS.

¹⁹ The definition of AxJ used by UBS varies slightly from that used in the rest of this paper. The UBS measure also includes Thailand, Indonesia, the Philippines and India.

Figure 13
Core inflation measures
(annual percentage change)



Source: DataStream.

increases in costs of production have been important contributors to increases in consumer prices and export prices in all our trading partner economies, not just those in AxJ.

5 What does this mean for New Zealand?

Impacts on inflation

Over the past decade, the impact of the global economy on inflation in New Zealand has changed.

Hodgetts (2006) finds strong reason to suggest globalisation and increased trade openness dampened inflation in New Zealand in the mid-1990s, as it did in many other economies. Since 1997, New Zealand retail prices for goods such as household appliances and clothing have fallen or have experienced relatively subdued rates of inflation. This has largely been a result of falls in the foreign currency prices for imported manufactured goods over this period (prices for these same items had been rising prior to 1997 – see figure 14).²⁰ Over this same period, there has also been a large increase in New Zealand's imports from low-cost economies such as China.

²⁰ Hodgetts (2006) notes that some of the softness in prices for imported goods is the result of competitive pressures in New Zealand.

Figure 14

Foreign prices for imported manufactured goods



Sources: Statistics New Zealand, RBNZ estimates.

However, since 2004, inflation developments in other economies have contributed to a less favourable inflation environment in New Zealand. Inflation in export prices from our trading partner economies, while still relatively low, has risen from the deflationary levels seen before 2004 (table 1). Additionally, commodity price increases have contributed to stronger domestic inflation pressures. Of these two developments, the latter may be of greater concern at this stage.

- Strong increases in the prices for imported commodities have directly contributed to higher prices in New Zealand. For instance, domestic prices for petrol in the CPI rose by 50 percent between March 2004 and December 2007.²¹
- Commodity prices increases have not been limited to imports. Growth in global demand has seen prices for some of New Zealand’s main agricultural exports also rising strongly in recent years, with particularly large increases in prices for dairy. These increases have passed through to higher domestic prices for food products such as milk and cheese.
- Commodity prices increases have also added to inflation in New Zealand via indirect channels and ‘third county effects’ (i.e., increases in the prices of the goods New Zealand imports due to rising costs of production in

other economies). Such increases have been most clearly evident in higher costs for transportation services (such as international air travel) and food costs (for instance, higher imported grain costs have contributed to higher poultry prices).

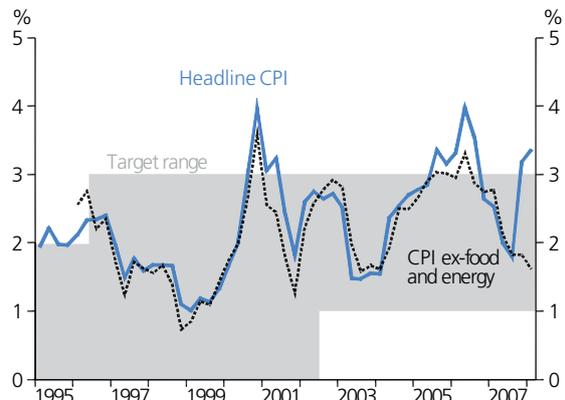
Challenges for monetary policy

Increases in inflation in our trading partner economies and the increases in commodity prices in recent years have created a more challenging environment for monetary policy in New Zealand. These developments have dampened consumers’ spending power.²² At the same time, they have contributed to headline inflation rising to levels above our target band (figure 15).

Figure 15

Headline inflation and ex-food and energy inflation

(annual percentage changes)



Sources: Statistics New Zealand, RBNZ estimates.

The situation is complicated by uncertainty regarding the persistence of changes in imported inflation pressures and commodity prices. Monetary policy-makers cannot know *ex ante* how persistent changes in imported inflation will be. We may look through the initial increases in imported inflation, if it is believed they are due to temporary phenomena (e.g., increases in commodity prices associated

²¹ While the majority of the change in motor fuel costs is attributable to changes in the costs of imported fuels, some of the increases in prices seen in recent years will be attributable to changes in exchange rates and taxes.

²² While higher prices for imported commodities have reduced households’ real purchasing power, strong prices for New Zealand’s commodity exports combined with movements in the exchange rate have provided some offset.

with poor weather conditions). However, if price increases are actually due to sustained increases in demand (as they appear to have been in recent years), there is likely to be less room to accommodate such increases. In large part this is because, with commodity prices continuing to increase over a protracted period, there is increased risk that inflation expectations will creep upwards. This uncertainty regarding the persistence of imported inflation pressures will also have implications for the level of domestic activity/non-tradables inflation that is consistent with our overall inflation aims.

As discussed in Bollard and Ng (2008), another article in this *Bulletin*, monetary policy considerations in this environment are finely balanced. The tightening of policy to offset lingering inflation pressures may risk exacerbating the slowdown in domestic activity resulting from strong inflation pressures and reduced real incomes. However, if policy is too loose, there is a risk that inflation expectations will become unanchored.

Ultimately, the Reserve Bank's Policy Targets Agreement requires us to ensure price stability. Of paramount importance in achieving these aims is ensuring inflation expectations remain anchored, as they play a pivotal role in determining the level of inflation at medium-term horizons. Monetary policy is unlikely to respond to the near-term impacts of recent increases in international inflation pressures. However, policy will need to remain sufficiently firm to ensure that inflation expectations remain consistent with our medium-term target for inflation (Bollard and Ng, 2008).

6 Conclusion

Over the past decade, New Zealand and our trading partner economies have enjoyed relatively low and stable rates of inflation. This is first and foremost a result of policies focusing on the achievement of price stability and reducing inflation expectations. Between 1997 and 2003, we also experienced inflation tailwinds in the form of increased trade with low-cost economies and low levels of resource pressures in the global economy. These developments helped to dampen inflation pressures in New Zealand.

But while inflation remains relatively low, increased strength in global activity (particularly the sustained strength in Axi) has contributed to an increase in global inflation pressures and commodity prices since 2004. In New Zealand, these developments have contributed to increased imported inflation pressures. The persistence of these increases has created a more challenging environment for monetary policy in New Zealand. In addressing these challenges, the Reserve Bank has had to carefully balance its medium-term price stability goals against its desire to avoid unnecessary instability in activity. In determining the appropriate stance of monetary policy in this environment, we continue to focus on ensuring medium-term price stability and that inflation expectations remain anchored.

There remains a large degree of uncertainty regarding the persistence of the imported inflation trends seen in recent years. Indeed, following several years where commodity prices have persistently surprised on the upside, prices for some commodities have softened very recently. As a result, we may now see some easing in the imported inflation pressure seen since 2004. However, with structural increases in demand for many commodities in Asia and emerging markets (as well as tight supply conditions for some commodities), the outlook for monetary policy may remain challenging for some time.

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The costs of inflation – what have we learned?

David Gillmore

This article reviews what we know about the long-run impact of inflation on economic growth. Economic theory tells us that both high inflation and deflation adversely affect the economy. Inflation tends to benefit the wealthy at the expense of the poor and those on fixed incomes and it reduces economic growth over the long term. The experiences of New Zealand and other industrialised countries since World War II generally support this negative long-term relationship between inflation and growth. The experience of Japan illustrates the negative impact of deflation. There is general agreement that both high inflation and deflation impact negatively on the economy. Recent empirical studies have estimated the level of inflation at which its long-run impact on growth becomes materially negative. For industrialised countries, this level is about 3 percent, while for developing countries it is around 11 to 12 percent.

1 Introduction

Our economic system will work best when producers and consumers, employers and employees, can proceed with full confidence that the average level of prices will behave in a known way in the future – preferably that it will be highly stable.

Milton Friedman¹

One of the basic principles of economics is that inflation is bad for economic growth. There is strong evidence that very high inflation is damaging to an economy – as was seen in Germany in the 1920s and currently in Zimbabwe. Equally, negative inflation (deflation) appears to be incompatible with healthy economic growth, as in Japan during the 1990s and early this decade. It seems clear that both high inflation and deflation impact negatively on a society's standard of living and on individuals' quality of life. But "there is less conclusive evidence whether moderate inflation is harmful or not".²

This article discusses the reasons why inflation is bad for an economy. Section 2 summarises the reasons economists give for how inflation impacts on the economy. These include redistributive costs (inflation benefits some people at the expense of others) and negative effects on the level of output and the rate of growth (inflation creates damaging inefficiencies in the economy). In line with much of the

literature, in this paper we focus on inflation's effects on growth.

How do the data support this theory? In section 3, the record of inflation and economic growth in industrialised countries since the end of World War II reveals that periods of low inflation have generally been associated with higher and more stable growth than when inflation has been high and variable.

Section 4 summarises the findings of studies that use sophisticated econometric techniques that aim at verifying the impact of inflation on economic activity. These techniques take account of other factors that may drive both inflation and output growth and influence the correlations observed in the data. Recent studies have estimated the rates of inflation above which the negative effects of inflation appear. Section 5 concludes.

2 Costs of inflation: theoretical arguments

This section summarises theoretical arguments concerning the negative long-run impacts of inflation on the economy.³ In general, inflation impacts negatively on growth and the distribution of income or wealth. The impact of inflation depends on whether it is anticipated or not. Anticipated inflation impacts negatively on growth, through the cost of

¹ Friedman (1968), p.13.

² Bernanke *et al.* (1990), p.17.

³ In the short term (for example, within three years), there is generally a positive relationship between inflation and economic growth. When economic activity rises above its potential level, inflation rises. This relationship is known as the Phillips curve.

changing prices, the cost of holding cash, and variability in relative prices. Through the tax system, it also reduces real value of savings and fixed incomes. Unanticipated inflation has both redistributive consequences and negative effects on growth.⁴

The impact of anticipated inflation on economic activity and growth

The higher the general rate of inflation, the more often firms must change prices. This comes at a cost, whether in printing new menus, re-pricing of items on display in retail stores, updating computer files, or in the potential negative impact on customer loyalty. Because of the cost involved in changing prices, some firms delay doing so, thus resulting in variability in price changes among firms. Faced with this variability, both individuals and firms need to spend more time and resources obtaining relevant information before making decisions. Thus inflation reduces the level of productive economic activity.

Inflation creates costs of holding cash and balances in non-interest bearing bank accounts. To overcome these costs, people tend to hold less cash, and maintain higher balances in interest-bearing accounts, withdrawing only when they need it. Potentially, there are costs to this activity also, both in the time needed and in possible missed opportunities due to not having cash on hand.

The redistributive effects of anticipated inflation

Inflation causes a deterioration of the real value of incomes fixed in nominal terms, such as benefits. This is usually overcome by governments indexing benefits to the rate of inflation. However, because benefits are usually adjusted by the previous period's inflation rate, their purchasing power deteriorates between indexation adjustments.

Inflation also causes loss of both income and savings through the progressive income tax system. Firstly, with a general wage and price increase, individuals can find their

incomes creeping up into higher tax brackets, and being subject to higher marginal rates of income tax. Secondly, the tax that is charged on the interest earned on bank deposits is based on the nominal (rather than real) value of deposits. Therefore both the portion of the interest that goes towards maintaining the deposit's purchasing power and the portion that is real income from the deposit are taxed. To illustrate this, if we assume that the rate of inflation and the interest rate paid on a bank deposit are both 5 percent, the interest paid is just sufficient to maintain the real value (purchasing power) of the deposit at a constant level. Any income tax on this interest will therefore reduce the real value of the deposit.

Redistributive effects of unanticipated inflation

In the case of long-term loans, if inflation is different from that which is anticipated, the return that the borrower eventually pays the lender differs from what each anticipated. If the inflation is higher than that expected when the loan was negotiated, the borrower gains at the expense of the lender. Those paying off mortgages at fixed rates of interest will benefit, while those who hold fixed interest-bearing bank accounts suffer. Thus there is, in effect, a wealth transfer from the latter group to the former. The reverse will be true if inflation is lower than anticipated.

Unanticipated inflation benefits borrowers because inflation causes the real value of their debt to diminish. Because debt is usually stated in nominal terms (it is not indexed to inflation), its real value declines as the price level increases. As their incomes rise in line with the general increase in the price level over time, borrowers find it easier to repay loans, as inflation reduces the value of their loan and repayments relative to their increasing incomes.

Another way to look at it is that unanticipated inflation causes the real value of savings to decline, especially when real interest rates are negative. That is, when the inflation rate is higher than the interest paid on savings, the purchasing power of savings is reduced. Thus, the financial worth of savers goes down. We note that those on fixed incomes are affected in two ways by inflation – by the reduction of the real value of both their incomes and their savings.

⁴ More detailed accounts of the arguments in this section can be found in Johnson (1993) and Briault (1995).

Inflation variability and uncertainty impacts on economic activity

When inflation is high, it is usually volatile as well. Why is this so? Milton Friedman suggested that it can be the result of the way government policies are adjusted.⁵ In this view, high inflation itself is usually the result of government policies (such as welfare policies) involving strong growth in government spending. But because governments also usually value stable prices, they react strongly against the inflation that eventually emerges, thus switching from one spending policy direction to another.

Variable inflation increases uncertainty throughout the economy – including uncertainty about the size and timing of future monetary policy responses.⁶ Additionally, high inflation may be volatile and associated with uncertainty because it may be caused by a real shock to the economy or by a government losing control of the economy.⁷

Uncertainty impacts on investment, because it makes the planning of future development more difficult. It increases the cost of gathering relevant information upon which sound decisions can be made.⁸ Firms may therefore delay planned investment projects until economic conditions are more stable, or demand a higher nominal rate of return for those they do undertake. These behaviours in turn impact negatively on output growth.

Increased volatility of inflation also reduces the effectiveness of the market by shortening the length of commitments (such as contracts and bank term deposits) to less than would be optimal in the absence of such volatility. But, because some contracts are fixed, people cannot immediately adjust the length of their existing commitments to the changed optimal length. Thus, sudden inflation exacerbates the rigidity or inefficiency in the market presented by fixed contracts.

High inflation has a tendency to become persistent through the wage-price spiral and through inflation expectations. Firstly, in wage-setting, negotiators take account of the general rise in prices and demand at least as much an increase, thus putting up firms' costs, which firms then pass through

to consumers in higher prices. Secondly, inflation easily leads to expectations within the economy of continuing inflation. While the wage-price spiral and inflation expectations do not constitute costs of inflation themselves, they add to the persistence of inflation and therefore add to any of the negative effects of inflation. It is very costly to bring high inflation back to lower levels. Countries typically experience recessions when tight monetary policies are needed to reduce inflation from high rates, as was experienced in New Zealand in the early 1990s.

Deflation (negative inflation) is also damaging to economic growth, as the experience of Japan during the 1990s illustrates. The main reason for this is that falling prices cause demand to stall, as consumers delay purchasing goods until some future when prices are expected to be even lower. Additionally, because nominal interest rates cannot be decreased below zero, under deflation the central bank cannot reduce the policy interest rate low enough to stimulate demand.⁹

The overall impact of inflation

From the above, it is clear that there are both redistributive and growth costs of inflation (whether inflation is anticipated or not). It is the poor and those on fixed incomes that suffer the most from redistributive effects – because the real value of their savings and incomes decline. They lack the financial resources or knowledge to purchase assets whose prices tend to rise with inflation. Those with higher wealth and disposable income are more able to avoid inflation, by buying more sophisticated financial assets or property. They also have more access to credit and therefore stand to benefit from the reduced real value of debt if inflation increases unexpectedly. These inflation avoidance activities therefore tend to accentuate the unequal burden of inflation on the poor and less well educated. They also divert resources from productive investment.

⁵ Friedman (1977), p.466.

⁶ Ball (1992), p.371.

⁷ Fischer (1994), p.276.

⁸ Greville and Reddell (1990).

⁹ Equally, a rate of inflation of between 0 and 1 percent is a potential source of risk to an economy. Such a low rate can easily turn negative. There is also an upward bias in inflation statistics – thus an economy could actually be experiencing the negative effects of deflation when the official inflation rate is positive, but less than 1 percent (Fischer (1994), p 284).

The mechanisms through which inflation affects economic activity and growth are less clear. While the costs to firms of changing prices and the costs of holding cash balances are easy to understand, they do not constitute a major cost to economic activity. However, the distortion of relative price signals that results from inflation has a far greater impact on the economy, because it can reduce economic growth.

Relative prices are important because firms and individuals make decisions on what to produce and purchase, based on the prices they observe. For example, an increase in demand for a good tends to cause an increase in its price, relative to the prices of other goods. Observing the price increase, firms have an incentive to produce more of the good. In turn, these firms will demand more of the inputs needed to produce the good. The outcome of this process is an efficient re-allocation of the economy's resources towards producing what is needed in the economy, as signalled by the movement in relative prices. The re-allocation is necessary for economic growth. If there is inflation, relative price movements are distorted or obscured, impeding growth.

Inflation can distort relative prices because the prices of individual goods tend not to rise in a uniform manner when there is inflation. Individual firms increase prices at different times. As a result, under inflation, some of the relative price movements that occur will no longer be consistent with signalling the efficient allocation of resources.

Inflation obscures relative price movements by making it less clear to decision-makers whether an increase in the price of a good is a change in its relative price or part of the general increase in prices. For example, an individual who is looking to invest might see certain prices increasing. Does the price rise represent a relative price movement in the industry the investor is looking at, or just a general inflation adjustment?

The answer matters for whether the person should invest. A wrong decision will be costly to the individual, but also costly to economic growth as a whole, because of the incorrect resource allocation.

3 Inflation in recent historical perspective

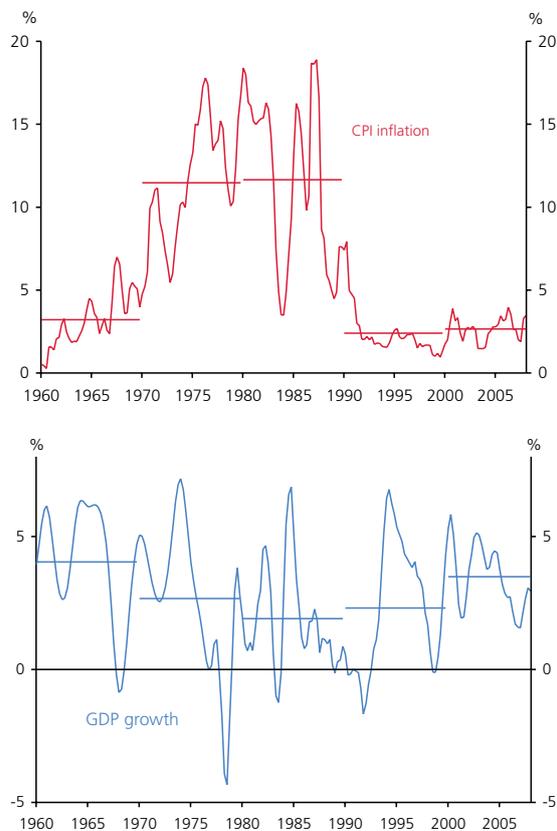
The evidence that inflation impacts negatively on economic growth is now well accepted by economists and policy-makers. In this section, we illustrate by looking at the inflation and growth record of New Zealand and other countries. A caveat to this exercise is that there are many determinants to growth (apart from inflation), and making inferences about causality requires more sophisticated econometric analysis – which we discuss in the next section.

The activity and inflation profiles of industrialised countries during the past 60 years, since the end of World War II, can be broadly divided into four periods, below.

The New Zealand data (figure 1, overleaf) is generally in line with this categorisation. The most striking feature of the inflation profile is the high and highly volatile inflation during the 1970s and early 1980s compared with the lower inflation before and after. We see that this period of high inflation is associated with lower growth than during the 1960s, when inflation was lower. Since the early 1990s, New Zealand has experienced low inflation – due to the commitment of the central bank to price stability, and to favourable global conditions (principally, the emergence of Asia as a major exporter of cheap manufactured goods). During this period, average GDP growth has risen.

Period	Economic activity	Inflation
1. 1950s and 1960s	rapid growth	moderate inflation
2. 1970 to mid-1980s	slower, volatile growth	high inflation
3. 1990 to 2007	sustained moderate growth	low inflation
4. 2007 to present	slowing activity	rising inflation

Figure 1
Inflation and GDP growth in New Zealand:
1960 – present



Horizontal lines indicate average levels for each decade.

Graphs for the US, the UK and Australia (figures 2-4) show similar profiles for inflation as that for New Zealand, with much higher rates during the 1970s and 1980s. Likewise, these countries experienced declines in GDP growth during the 1970s and 1980s relative to levels of the 1960s. However, they do not display an obvious increase in GDP growth from the 1990s (except for the US in the current decade) as we might expect on the basis of the theoretical considerations discussed earlier.

Overall, a casual observation of these inflation and activity profiles supports the theory that high inflation is associated with low GDP growth. Japan from 1990 to 2007 illustrates the phenomenon that deflation is also harmful to growth (figure 5). When the US and other industrialised countries were experiencing prolonged growth in output and low inflation, Japan was suffering from deflation and a contraction in activity that followed the bursting of housing and stock market asset price bubbles.

Figure 2
United States

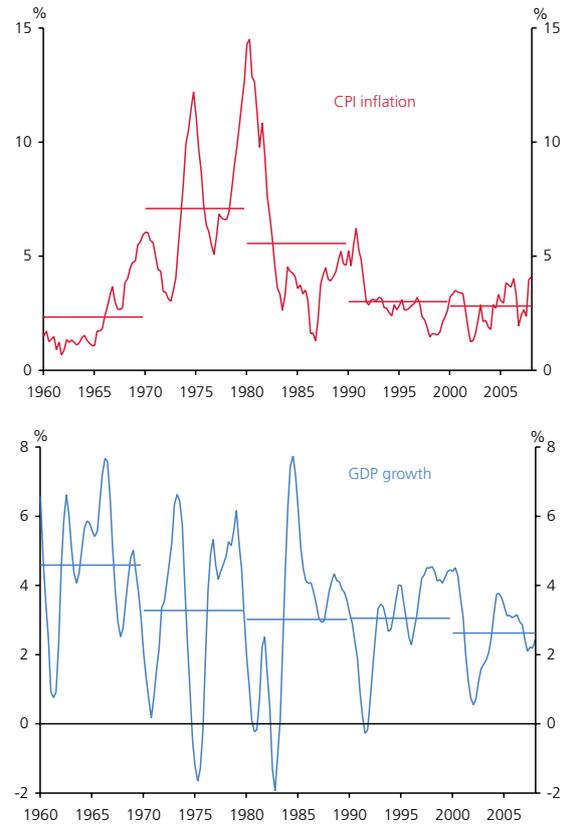


Figure 3
United Kingdom

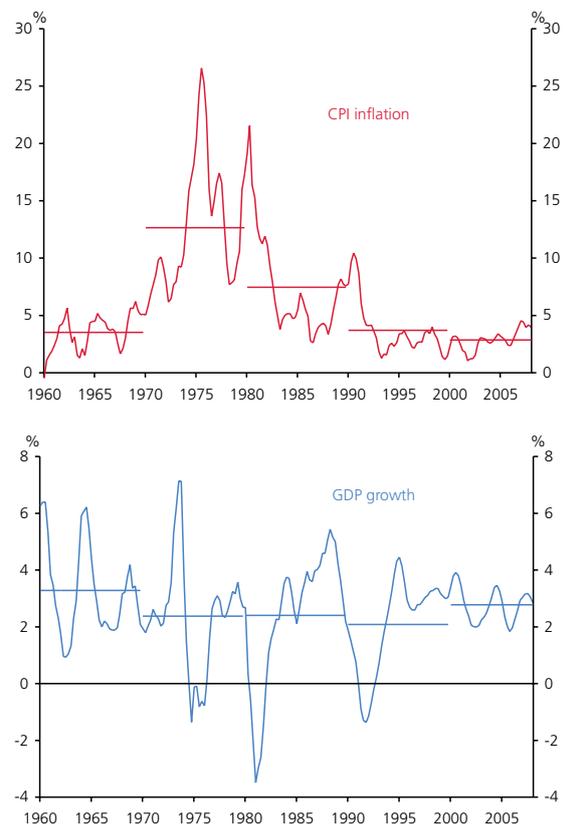


Figure 4
Australia

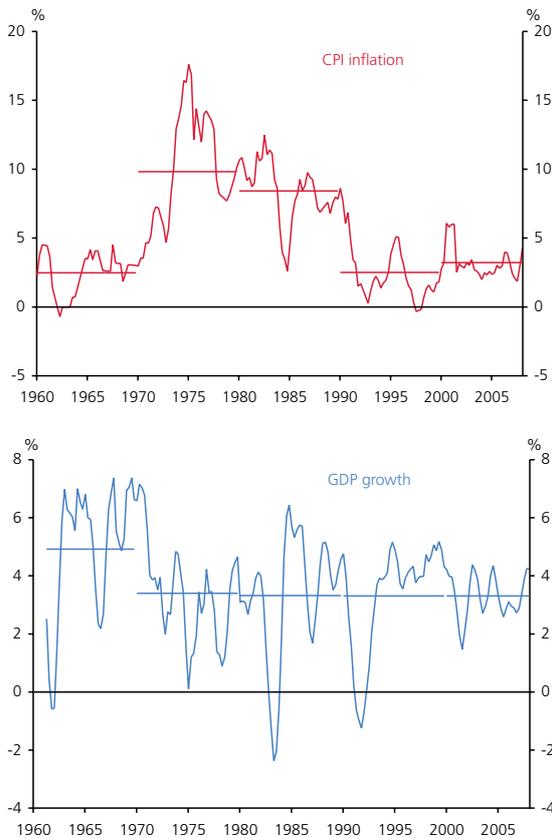
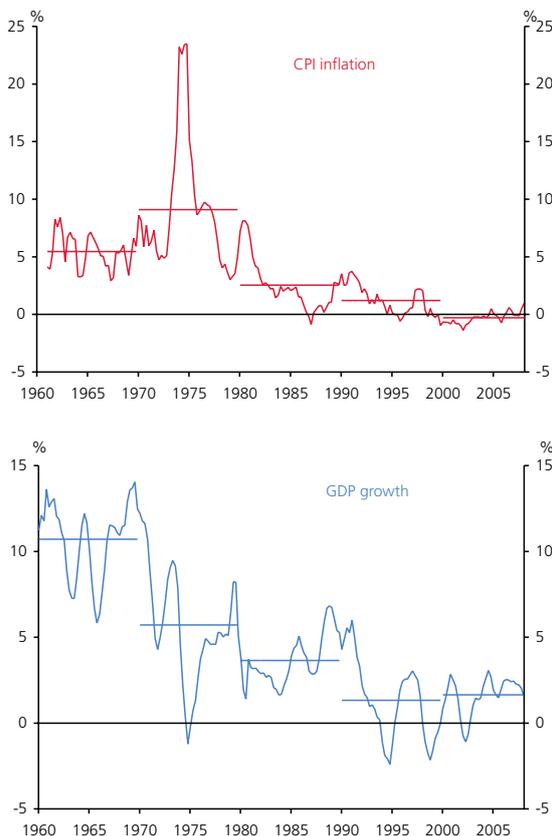


Figure 5
Japan



4 Summary of the empirical literature

In the previous section, we looked at the inflation and GDP growth experiences of a number of countries. The determinants of GDP growth, though, are more complex than the inflation rate alone. In this section, we outline the main complexities in the inflation-growth relationship before summarising the findings of empirical studies that have tested whether there is a negative relationship between inflation and economic growth, taking account of these other factors.

There is the issue of causation. High rates of inflation tend to be associated with lower growth, as the empirical studies show us. But does inflation cause lower growth? Or are there other common factors influencing both? High inflation may be associated with low economic growth because both are the result of government policies that are damaging to the economy. High inflation may therefore be a symptom of bad economic management – an indicator that the government is running a set of policies inconsistent with sustained economic growth.¹⁰

Other common factors could be driving the negative relationship between inflation and growth. While improved monetary policy is recognised to have made a considerable contribution to the ‘Great Moderation’ (the period since the mid-1980s, during which lower, more stable inflation has occurred with higher, less volatile growth), other factors may have been just as important. These include changes in the structural features of the economy (such as improved business practices, technology, and financial innovation) and good luck (favourable economic shocks – such as the lower prices of consumer goods imported from Asia).¹¹

The general consensus from the empirical studies is that growth is significantly and negatively related to inflation. However, the relationship between inflation and growth is different for different rates of inflation. At very low positive rates of inflation, the growth rate seems to be independent of inflation, while higher rates of inflation (and negative inflation) significantly damage growth. It is now generally

¹⁰ Fischer (1993), p.437.

¹¹ Bernanke (2004) and Ferguson (2006).

accepted that the threshold level of inflation for industrialised countries is in the low single digits, while that for developing countries is higher.

Early studies assumed a linear relationship (that is, that an increase in inflation of a certain amount would have the same effect on growth at all levels of inflation). Fischer (1993) was among the first to investigate a non-linear relationship – that different levels of inflation (above a certain threshold level of inflation) impact differently on growth. Arbitrarily choosing a threshold rate of 15 percent inflation, he found that for positive rates of inflation below 15 percent, an increase in inflation is associated with an increase in growth, while above 15 percent, an increase in inflation is associated with a reduction in growth.

Subsequent studies have focused on estimating formally the level at which the impact of inflation on growth changes, by using more sophisticated econometric techniques.¹² An influential paper by Khan and Senhadji (2001) estimated the threshold levels at which inflation impacts negatively on growth as between 1 and 3 percent for industrialised countries, and 11 and 12 percent for developing countries. Subsequent studies have confirmed their finding.¹³

The findings of this research support central bankers' goal of maintaining low levels of inflation (in low single digits for industrialised countries, and at least close to single digits for developing countries) – and that doing so is conducive to improved economic performance.¹⁴

5 Conclusion

It is well recognised that high and volatile inflation is detrimental to economic growth. In this paper, we have outlined the theoretical arguments why this is so, noting that both anticipated and unanticipated inflation have costs in terms of redistribution and their impact on activity and growth.

In considering the evidence, we noted that the inflation-growth experiences of New Zealand and some other

industrialised countries were generally in line with the theory. The high inflation during the 1970s and early 1980s was associated with lower and more volatile growth than in previous decades, while lower inflation since then has occurred during a prolonged period of expansion. However, we recognise that there are many determinants of growth apart from inflation.

Recent empirical studies that investigate the inflation-growth relationship have focused on estimating the levels of inflation at which the impact of inflation on growth changes. There is now general agreement that for industrialised countries this threshold is about 3 percent, while for developing countries it is around 11 to 12 percent.

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¹² Brook *et al.* (2002) summarises this literature.

¹³ For example, Drukker *et al.* (2005).

¹⁴ Khan and Senhadji (2001, p. 20).

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Events precede ideas: Bob Gordon on macroeconomics and monetary policy

Interview conducted by Emmanuel De Veirman and Tim Ng¹

Professor Robert J. Gordon, the well-known macroeconomist, visited New Zealand recently to speak at the international conference “Markets and Models: Policy Frontiers in the AWH Phillips Tradition” held from 9 to 11 July 2008. Professor Gordon is Stanley G. Harris Professor in the Social Sciences and Professor of Economics at Northwestern University in Illinois, USA. He has written extensively on the topics of productivity, price indices and the Phillips curve. He served on the US Boskin Commission in 1995-96, which assessed the accuracy of the US Consumer Price Index. We caught up with Professor Gordon for a chat about macroeconomics and some of the challenges facing monetary policy.

When and why did you choose to become an economist?

My PhD was 41 years ago. As an undergraduate, I briefly majored in history but found it too subjective. I liked the certainty of economics. A major influence was also that my father was a well-known professor at the University of California, who went on to become president of the American Economic Association. I could see the wonderful combination of secure employment with no worries about career advancement or unemployment, together with being a self-employed entrepreneur able to choose, within limits, one's own hours and how you divide up your time.

How did you get on in those early years?

I learned fairly early on that there's a distinction in universities between the insiders and the outsiders. Everybody who receives tenure in a good university faces 35 unrelieved years of doing the same thing, unless they can find something interesting and different to do along the way. Insiders are those who are attracted by university administration. They put a lot of work into being chairman of the department in order to get promoted to being deans, and ultimately to being university presidents.

The outsiders reach out to have an influence on the thinking of people outside their own university. They like to go to conferences, they like to write papers and get



Bob Gordon on the dynamic demand-supply approach to the Phillips curve. “You can explain anything with this diagram – events in the US since 1954 and before then; you’ve got the wars, price controls, everything else.”

Photo: Tim Ng.

them published and change the way people think. I was an outsider from the beginning. I never had any interest in university administration.

How did you come to choose the topics you’ve focused on?

There are two styles of research at least. There's a style associated with some of the most brilliant economists – for example, Greg Mankiw, Larry Summers – flitting around from topic to topic, having an impact on almost everything they touch, without any particular concentration on a single field. To do that, you've got to be very good and very smart.

There's another style that I associate with the late Zvi Griliches. That style is to own a topic, and to keep coming back to the

¹ **The views expressed in this article are those of Professor Gordon, and are not necessarily those of the Reserve Bank of New Zealand.**

puzzles in that basic topic. For him, it was everything to do with the production function, whether it was labour, the IQs of twins, capital, or measuring inputs.

In my case, I started out fairly early, with the Phillips curve and the explanation of inflation. Models of inflation blew up and changed. I thought it was my job and my duty to pick up what Robert Lucas once called the wreckage, and reassemble the pieces and make it work again. That's a lot of what I did, in the first 10 or 15 years after my PhD.

“ Models of inflation
blew up ... I thought
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to pick up the
wreckage and make
it work again. ”

I always had a second line of work, which continues to this day. That was an interest in economic measurement, especially of prices. I worked for many years on a book, published in 1990, in which I went back to the drawing board and tried to find ways of measuring prices that were completely independent of the way the government computed their own price indexes. I was particularly interested in durable goods like automobiles and computers. Two of the most important sources that I used were the Sears, Roebuck catalogue and Consumer Reports magazine. These had the kinds of nitty-gritty data that I needed. Lo and behold, I found that the official price indexes for these durable goods were biased upwards. They overstated inflation by as much as 2 or 3 percent per year.

From the measurement issues and the Phillips curve, I branched out into productivity, partly because the research on price index bias is directly relevant for productivity. If price indexes are biased upward, then real GDP is biased downward and the productivity trend is understated. So, productivity, inflation and unemployment have pretty much been the topics that I keep coming back to, like Griliches kept coming back to the production function.

CPI bias is very topical when you have low inflation and narrow inflation target bands. Do you think the price indices in typical use now are fit for purpose?

Griliches and I worked together on the Boskin Commission, which was set up in 1995–96 to officially evaluate the US price indexes. The Commission came to the conclusion that the US CPI was biased up by 1.1 percent a year. A few of the issues have since been fixed, but the basic stumbling block that is impossible to fix is the so-called new product bias.

Can you explain?

What is the value to people of having a cell phone, when no such thing existed 20 years ago? How do you measure the improvement in the standard of living from the introduction of these new products? You know that people are buying these things – they're spending a huge amount of their budget, by my standards at least, on cell phones for themselves, for their teenagers, for their children. To divert that much of the family budget to something totally new means it must be of tremendous value. The value from the introduction of new products is not being captured by the price indexes at all. The typical indexes start out with a new product and track its price changes after it's introduced, but nothing is attributed to the value of the introduction itself.

This is the idea that when a new product is introduced, its price drops from the household's reservation price to its actual price...

That's right. The idea of the reservation price was something that was pursued in the case of cell phones by Jerry Hausman at MIT. It's very hard to implement, but in principle that's what you should be doing.

A related problem is that the CPI traditionally introduced products late. It didn't introduce the automobile until 1935, about 30 years after Henry Ford invented the Model T. Another example is the video cassette recorder, which was introduced at a price of about \$1,500 in 1978 in the US. The price fell rapidly to about \$200 in 1987, at which point they introduced it into the CPI. So the further price evolution is only tracked from the \$200, not from the \$1,500. The

right way to do it is to take the video cassette recorder from the minute it's introduced, have a very small weight on it since not many people can afford to buy it, and then gradually change the weight as you trace the decline. Many new products, especially electronic ones, have a history of tremendous declines in price, which goes on to this day in the case of computers.

The Boskin Report came out in the mid-nineties.

What would be your estimate of the bias now in the US CPI?

I did a piece called "The Boskin Commission Report: A retrospective one decade later". While they've improved some of what is called the substitution bias – how you weigh together the different components – the new product bias is, if anything, more important. I think the overall bias in the CPI is still around 1 percent per annum.

There's another thing that's important to note. If you go back in time, before the late eighties, there are two very important parts of the CPI that were biased in the other direction, namely housing and apparel. Looking at CPI bias in earlier decades, you have to weigh the upward bias of durable goods against the downward bias of housing, which is the most important single part, and of apparel. Maybe some other things too. No one's ever done a decent study of the CPI for food, for instance. It would need to take account of the invention of all the convenience and frozen foods and things that people obviously value, because they're buying them.

One of my current projects – to show you how I never move very far away from the same central topics – is to construct a retrospective estimate, putting together everything anybody has ever done on CPI bias for the whole twentieth century in the US, right up till now. This would take account of the fact that the problems were different in every decade, and the bias is different in every decade. I bet we'll come out with quite a different chronology of economic growth, because every time you change the CPI, you're changing real growth in GDP and productivity.

Why was there a downward bias in housing and apparel?

They're both really easy to explain. The price of owner-occupied housing services has long been proxied by the rent people pay for apartments. The downward bias occurred for the most bizarre reason. They asked tenants, starting in 1942, how much they paid for rent. Well, minor problem. When tenants move to a different apartment, they have no idea how much the previous tenants were paying, and hence they have no idea of the percentage by which the rent they are paying differs from that paid for the same apartment in the previous year. What should have happened is that you ask the landlords, to get a consistent time series. A substantial portion of rent increases happen when the old tenant moves out, so they were missing many of the basic rent increases. They finally figured out how to fix this in the late eighties, but it was there for 40 or 50 years.

“ Important intellectual developments have the greatest impact when they solve a perceived puzzle or inconsistency... events precede ideas. ”

Now, for apparel, particularly women's apparel where fashions matter, the problem was this. The new model dress would come in. After a while, it would go on sale. They would track that price decline. But then they wouldn't link in the new-style dress when it was introduced a year later. They would miss the whole price increase when the sale was over and the new model came in at full price.

So, apparel is hugely downward biased. To see this, all you have to do is look at the 1910 Sears catalogue and compare

it with what people pay now for clothing. You could get the most elaborate dresses with frills and bows and vast amounts of hand labour from the Sears catalogue for \$4 in 1910. You couldn't get anything comparable to that for hundreds today, and yet the CPI for apparel has increased relatively little.

Back to the Phillips curve. Bill Phillips' original paper in 1958, documenting the relation between wage inflation and unemployment, is very non-technical by today's standards. A macroeconomist working today would have to do much more involved econometric work to convince the profession of the existence of any economic relationship. Why was Phillips' article such a major breakthrough at the time?

Important intellectual developments have the greatest impact when they solve a perceived puzzle or inconsistency in economics. The best example of that is the acceptance of Keynes' General Theory, after the puzzle of the Great Depression that nobody understood at the time. Before Keynes, people proposed fighting the Depression by raising taxes instead of cutting taxes. Another great example was Milton Friedman's natural rate hypothesis of the late 1960s, published in the middle of an accelerating inflation that went beyond most forecasts. Lo and behold, Friedman made it all very logical why this was happening.

I think the impact of Phillips was through Samuelson and Solow a year later, who christened the Phillips curve. It was the application to US data in a period when the economy seemed to be weak, but inflation was not negative or zero, it was positive. Nobody had a model at that point to explain why inflation would be positive when the unemployment rate was above its 'full employment' level.

We know now that the full employment level was at a higher unemployment rate than people thought at the time. Phillips, though, provided a whole new framework – a continuous non-linear curve. Before, everybody was thinking of L-shaped supply curves, where inflation would be zero as long as employment was below full employment,

“ Output and prices can be positively or negatively correlated. That's ancient microeconomics, but it was new to macroeconomics. ”

but suddenly if you got to full employment then you'd be off to the races on inflation – it would be all demand-pull. Whatever happened when you were at high levels of unemployment, that was called cost-push. And they were alternatives to each other.

After the Phillips curve was redone in the seventies to take account of oil prices, suddenly we had a relationship in which demand and supply played equal roles. Output and prices can be positively or negatively correlated. That's ancient microeconomics, but it was new to macroeconomics.

What major developments in macroeconomics do you think have got less traction than they deserved?

I'm surprised that the dynamic aggregate demand and supply model that I helped to develop is so widely ignored in recent research on inflation. That model met the need of explaining a current puzzle. This puzzle was how, after learning from Phillips that inflation and unemployment were negatively correlated, could inflation and unemployment all of a sudden be so positively correlated? Another puzzle was, if you actually looked at the numbers for the 1970s, inflation leads unemployment. It wasn't unemployment leading inflation as it had been in the 1960s.

The way I like to put it is that events precede ideas. The big macro puzzles have all led to resolutions of one kind or another. One of the resolutions in the mid-seventies was that there is no solution for policy-makers to avoid adverse supply shocks. You have to take the hit in some combination

of higher inflation and lower output. You can't avoid both. In the seventies in the US, they split the difference. We wound up with inflation going from 5 to 10 percent, and an even worse recession five years after the initial shock.

That's very relevant for 2008, and it's very relevant to the central banks that explicitly try to target inflation. They have to either ignore the oil and food parts of inflation as they are currently doing, or fight back really hard to beat down the inflation rate including oil prices, condemning the economy to a serious recession.

“ There is no solution for policy makers to avoid adverse supply shocks. You have to take the hit in some combination of higher inflation and lower output.”

People are making different choices in different places. The European Central Bank is more serious about fighting inflation. As for the US Federal Reserve, over the last 20 years the evidence is that it only cares about output. It's hardly tried to fight inflation at all. The Fed was just very lucky that we had a series of positive or beneficial supply shocks in the late nineties that allowed the economy to expand without inflationary consequences. Until 1999, oil prices were unbelievably low. The dollar appreciated from 1995 to 2002 pushing down import prices, and we've had this productivity revival that's great for inflation. So, they were handed a gift.

What do you make of the current housing market downturn and the role of monetary policy?

What's beyond debate is that US interest rates were held down too low, for too long, between 2001 and 2004 – and that this led to the housing bubble and to the excesses of refinancing. But Fed interest rate policy was not the only factor. You also have to look at the failure of US institutions to coordinate the regulation of the mortgage brokers and sub-prime mortgages. This episode has involved both fraudulent behaviour, and people signing papers they didn't understand. There was lack of disclosure. So it was a regulatory as well as a monetary policy failure that led to these problems.

In the mid-1990s, one of the important developments in the thinking about monetary policy was the so-called Taylor rule. This states that the central bank sets the short-term interest rate to fight both inflation and insufficient output, with some weight on the deviation of inflation from the target and some weight on the output gap, or the deviation of output from the desired level.

No Taylor rule can explain anything close to the low level of interest rates in that three-year period, 2001–04. In fact, to even get moderately close for the whole period after 1990, you have to assume the Fed had 100 percent weight on output and zero percent weight on inflation. This is diametrically the opposite of the Volcker weights, which in 1979 to 1983 were clearly about fighting inflation.

But the Taylor rule doesn't capture everything that's relevant...

(pause) I think the Fed faced an inflation environment that was sufficiently benign that it could ignore inflation. You might well suggest that if we had had higher inflation, then the Fed might have used a different kind of weight. The Fed's own policies are endogenous to the environment it faced. I mean, Volcker wouldn't have needed to invoke these draconian high interest rates in 1980-81 if he didn't face 10 percent inflation. If he'd had 3 percent inflation like Greenspan, the policy would've been entirely different.

What's your assessment of monetary policy through the current credit crunch?

I think the Fed lowered interest rates too far. I think the outcome of declining real output or recession is almost beyond their control. With higher food and oil prices, they're faced with a classic supply shock. By making their official policy target core inflation excluding oil and food prices, they're attempting to finesse the inflation that they're inevitably going to create.

Eventually, the food and oil prices will feed through to the rest of the economy. They have to. We read daily about increases in trucking rates, railroad prices, airline prices, plastics, restaurants raising the price of food because the price of corn has gone up – there's nothing the Fed can do about that.

If, to be fair, we say this whole thing is out of the control of the Fed – the housing thing has to work itself out, and they can't directly affect that – then they should be cleaning up their act by planning the set of regulations that is going to make the next episode less damaging and less dangerous.

“ The Fed should be more like the European Central Bank and less like itself.”

Do you think the Fed's famous 'dual mandate', contrasted with, say, New Zealand's single inflation objective, makes a difference to the central bank's ability to handle this type of supply shock environment?

The dual mandate makes it more likely that they're going to let the inflation horse out of the barn and it's going to run away. As far as I can see, the Fed is doing now what it did in the 1970s, but with a much better-behaved real economy. To quote a famous phrase in late 1974, the economy then was “in freefall” – it was declining at amazing rates in real

terms. It's not declining at all at the moment. The percent declines in employment are extremely small by historical standards, so with the real economy in much less trouble than it was in the seventies, this is the time for tighter policy by the Fed. Let the real economy work its way out.

It's a puzzle to me. I think interest rates now are too low. The Fed should be more like the European Central Bank and less like itself.

Wouldn't the rejoinder be that there are financial system problems to take into account?

Whether the short-term interest rate is at 2, 3 or 4 percent is completely independent of specific acts to bail out the financial community. There were enormous losses by stockholders and major New York financial institutions, so it's not as if the Fed is cleaning the slate and preventing rich people from hurting.

They still don't know whether they did the right thing to take 30 billion dollars of possibly bad debt off the books of Bear Stearns. And they don't know whether they'll have to do it again, because housing prices continue to fall and more and more mortgages are under water. There are a lot of bank balance sheets that are broken, and this is spreading from New York into the regional banks. Banks have made a lot of loans to house builders, and house builders are saddled with inventories of expensive land. They can't afford to build houses because they can't sell the houses.

This thing is like a slow motion train wreck. What I can't believe is that the stock markets thought that the worst was over in March. One of my best investments was a South East Asia mutual fund, which had unbelievably rapid returns, up until the fall of 2007. I could see the slow-motion train wreck. I had no idea it was going to take this long, but I sold out of every equity I had including South East Asia and now they're down at double the rate of the American stock market. So, you know, you can make money out of macroeconomics. Too few people do it.

“ You can make money out of macroeconomics. Too few people do it. ”

None of this is a reason for loose monetary policy or for us to take our eye off the ball in terms of inflation.

Right. The fact is, the Fed doesn't have enough instruments. Manipulating the Federal funds rate is just too small an arsenal of weapons to cope with double objectives of output and inflation, and a third objective, which is to stop a meltdown in the financial markets. For that, you need some sort of coordinated action by the Federal Reserve and the US Treasury. People can differ about the danger of moral hazard in the future versus bail-outs now that stop an absolute panic.

Let's move away a bit from current policy dilemmas. At the conference tomorrow, you're giving a talk on the history of the Phillips curve. What are the most important developments since the original Phillips paper?

The history of the Phillips curve falls into two phases, before 1975 and after 1975. We all understand the evolution from the Phillips-Samuels-Solow policy trade-off that ignored the role of expectations in shifting the Phillips curve, through the Friedman-Phelps natural-rate hypothesis. That's universally accepted now, that money is neutral in the long run and policy-makers cannot choose particular rates of unemployment.

By 1975, inflation and unemployment had clearly become positively correlated, leading Lucas and Sargent to say that Keynesian economics was lying in wreckage. Now the job of reviving the Phillips curve faced a fork in the road with two paths after 1975 – with virtually no communication between them. That continues to this day.

Both developments are valuable but they apply to different situations. The fork that I've been associated with involved reconstructing the Phillips curve by bringing demand and supply from microeconomics into macroeconomics. That is, you set up a dynamic aggregate demand and supply model. The demand side is represented by the growth of nominal GDP in relation to long-run potential output growth. The supply part is the traditional Phillips curve joined together with supply shocks that can push the Phillips curve around.

“ The empirical dominance of the dynamic aggregate supply and demand model is overwhelming in explaining the post-war US inflation process. ”

With that model, you can generate any kind of correlation between inflation and unemployment you want – negative or positive. You can have loops around the Phillips curve. After a demand expansion, output goes up and inflation goes up. In stagflation, output goes down and inflation goes up. Everything that we've observed in the post-war US can be explained by this aggregate supply and demand model. It's been estimated and validated a million times.

The other fork in the road consists of models that allow expectations to jump in response to actual and anticipated changes in policy. The best examples of that are the ends of hyperinflation that Tom Sargent documented so well 25 years ago. In these kinds of settings, there's no Phillips curve. Instead, there are people studying every nuance of what the government is doing. When the government finally decides it's going to stop fiscal deficits – it renounces the currency and has a drastic monetary reform – expectations can adjust

very fast without any backward-looking reliance on the actual inflation numbers. Clearly, you would want that kind of model if you were living in Argentina, or other highly volatile macroeconomic environments.

An offshoot of this approach, what you might call unharnessed expectations, is the New Keynesian Phillips Curve, which emphasises forward-looking expectations. This is again based on what policy-makers are expected to do. Now, the problem with the unharnessed-expectations approach, as valuable as it is for Argentina and hyperinflations, is that it cannot deal with persistence and inertia of the type that dominates the US inflation process.

Do you think the hybrid models go some way to addressing that?

No, no. The hybrid models are all New Keynesian. Empirically, they all wind up with backward-looking lags, because nobody knows what the forward-looking variables are. All people do is substitute out the forward-looking expectations by some set of restrictions. Jeff Fuhrer at the Boston Fed was the first to show that. The New Keynesian Phillips Curve really amounts to nothing more than short lags of inflation, the current value of unemployment relative to NAIRU [the non-accelerating-inflation rate of unemployment] and that's it. No supply shocks, no explanation of what happened in the 1970s.

My history of the Phillips curve shows that, in a horse race between the dynamic aggregate supply and demand model, with its explicit emphasis on inertia and supply shocks, versus the New Keynesian Phillips Curve without all those things, the empirical dominance of the demand and supply framework is overwhelming in explaining the post-war US inflation process. Goodness of fit statistics are four times better, with much better performance in post-sample simulations.

Where do we wind up? We've got different inflation experiences around the world. One of these models is good for some of them. The demand-supply inertia approach is clearly better for the post-war US. Nobody has been talking across these models to answer the currently unanswered question – that would hopefully be a good research topic

for the next few years – which is where you draw the line in applying these models. We can think of examples where the Phillips curve, whether it's with supply-demand dynamics or not, doesn't work at all. There's no Phillips curve in the Great Depression, with 25 percent unemployment. As soon as output started rising, prices started rising. They didn't keep falling as they were supposed to do.

If you develop a model for the post-war US, then go back over previous periods, the Phillips curve disappears from 1929 to after World War II. I looked at this a long time ago by constructing quarterly data that went back to 1890. When there are events that people can see, like World War I or World War II, the Phillips curve shifts.

I also found a substantial effect of the first New Deal legislation – the National Recovery Administration, NRA – which was official policy to try to get prices and wages to rise. They were confused in those days, equating high unemployment with deflation. They thought everything would be cured if they made prices rise, which is exactly the

“ It would be better if we all just start talking to each other. ”

opposite of what macroeconomics says now. So, if you try to go back before 1954, my favourite Phillips curve doesn't work for much of US history. So even in US history, there's room for the expectations-meets-policy-maker view.

Another example is the convergence of inflation rates within Europe, in the run-up to the euro. In the late 1970s, Germany had 4 or 5 percent inflation; Italy and the UK were above 20 percent. Today, European countries have similar inflation, but it didn't all happen the day the euro was introduced. Gradually throughout the 1980s, expectations changed in anticipation of a currency union. Therefore, the Phillips curve in a place like Italy wouldn't just have lagged Italian inflation in it, it would have lagged German inflation, because they could see that that was the way they were going.

Now those are models that you can jerry-build on top of the US Phillips curve, but then it is a different kind of model, because it has a type of explicit rational expectations. So there's a middle ground in there, where both of these approaches are useful and valid, but we don't have any kind of clear sense of where to split the line and say, I need this model, I need that model. It would be better if we all just start talking to each other.

Let's say we can model inflation expectations perfectly. Would that remove all the instability in the Phillips curve?

No. One of the important aspects of the dynamic aggregate demand and supply model is that it interprets inertia, the role of lagged inflation, in determining current inflation as involving far more than expectations. Those lagged effects involve formal and informal wage contracts, price contracts and lags that enter between the changes in crude materials

“ Where the Phillips curve applies is very limited in time and space. ”

prices and final goods prices. We're seeing a great example of that right now, while we wait for the spillover into the rest of the economy of the oil prices.

You might ask, why don't final goods prices go up immediately when the oil price goes up? Because of competition, basically – costs haven't gone up yet. People are waiting for DuPont to raise the price of plastics. If they jerk their price up now, it would be competed back down.

How then should we understand the role of expectations?

You know, price equals marginal costs. The real flaw in Friedman-Lucas-Phelps was to put the expectational barrier to knowledge in the wrong place. They said the business cycle

occurs because people have the wrong macro expectations, but people can see the published CPI every month. What people don't know is at the micro level – there's uncertainty there. They look into the whole chain of their suppliers. For an automobile or an airplane, there are thousands of suppliers. You don't even know who they are three or four steps back in the input/output table. I christened that idea the input/output model, to explain inertia.

Think of a 2x2 matrix, with demand and supply shocks in one dimension and micro shocks and macro shocks in the other. Macro demand shocks are the Argentina kind of thing. Lucas showed in 1973 that you would expect the Argentinean Phillips curve to be much more vertical than the US Phillips curve. That's the role of macro shocks and macroeconomic volatility.

But there are micro demand and supply shocks also. In the language I like to use, these shocks prevent the inflation rate from mimicking changes in nominal GDP and mean that real GDP is the residual. The barriers to price adjustment make real GDP, for a while, mimic whatever is going on with nominal GDP. The simplest example to say that's got to be true is import prices.

There's no need for import prices to pay any attention to what nominal demand is doing in the domestic economy, because it's set by some totally different set of factors. The individual producer trying to set price equal to marginal cost has absolutely no incentive to look at what nominal GDP is doing. So that unhinges prices from macro developments. You know, this goes all the way back to Lucas saying there should be no effect of anticipated money changes or anticipated nominal GDP changes on output. Well, yes there should be, and the inertia and the stickiness are what give rise to it.

By the way, that paper where I took the data back to 1890 – it was published in the *Journal of Political Economy* in 1982 – showed that the Lucas supply function is nested in this more comprehensive view. It's actually very interesting to look back at those dummies for World War I and World War II and the NRA and Nixon controls. The best way I know to make the point is that where the Phillips curve applies is very limited in time and space. When we find it, we raise the

American flag and say, that's where it applies.

(laughter) Can we step back now, just to wrap up. What has surprised you most about developments in macroeconomics and policy making?

(pause) Well, let's start narrowly with the Phillips curve. I'm surprised there's been such dominance of research on this unharnessed-expectations side of the post-1975 developments, to the exclusion of people paying attention to this alternative approach I've called dynamic supply and demand. Again, at the level of the Phillips curve, I think the stability of inflation from 1990 onwards in the US is surprising. The lack of movement in core inflation in the last two or three years, despite the volatility of food and oil prices, is surprising.

“ There's been a lot of flailing around in macroeconomics trying to find answers for non-puzzles. ”

Then we have the Great Moderation – that is, the greater stability of real GDP changes, which is commonly dated back to 1984. This makes total sense, since the 1982 US recession was the last really big recession we had, so of course 1984 is taken as the start of the new era. There's been a lot of debate about the Great Moderation and I'm surprised that people think that the stability was achieved by monetary policy. In fact, if you look at it, the stability was achieved by much smaller shocks and a transition from entirely adverse shocks in the seventies to largely beneficial shocks in the 1990s. Again, this is taking the American perspective of what has been most surprising.

So, instead of being the great master that created the Great Moderation, the Fed has just been lucky. I was going to write a paper about this a while ago, right after Bernanke was inaugurated, called something like “Greenspan versus Bernanke: The Maestro versus The Victim”. Because you

could see already, in 2006, that Bernanke was going to face the change from the beneficial supply shocks to the adverse supply shocks that inherently make the job of the central banker impossible, to carry out both the Fed's stated objectives.

One broader answer to your question is that I don't think there have been that many surprises. I think there's been a lot of flailing around in macroeconomics trying to find answers for non-puzzles.

I did a presentation about five years ago, on the occasion of the 25th anniversary of a conference series. I said, okay, what have we accomplished in the last 25 years compared to the previous 25 years? Well, the previous 25 years goes from 1953 to 1978. It includes Friedman's permanent income hypothesis, Jorgensen on investment, Tobin and Baumol on money demand, and all the foundations of macroeconomics. It includes Friedman and Phelps on the natural rate. And before 1978, we even had the development of my kind of theory of policy responses to supply shocks and the aggregate demand and supply model.

What do we have after 1978? I think macroeconomics has been disproportionately involved in digging out of dead ends, whether it's Hall's rational expectations theory of consumption in a world where many consumers are liquidity constrained, or the Q theory of investment. The all-time dead end is real business cycle theory. You know, trying to take a world of demand and supply and building a model that has no prices baffles me.

So, I guess you could say that I am a self-satisfied old-fashioned macroeconomist, who thinks that by 1978 we knew most of the answers. I look in dismay as I see so many people who don't understand the right answers. That's a good way to end this. It'll make me sound like I'm different.

(laughter) Thanks for chatting with us.

No problem. So you're going to come to my talk tomorrow?

Sure.

Okay, good.

Financial turmoil and global imbalances: the end of Bretton Woods II?

Chris Hunt

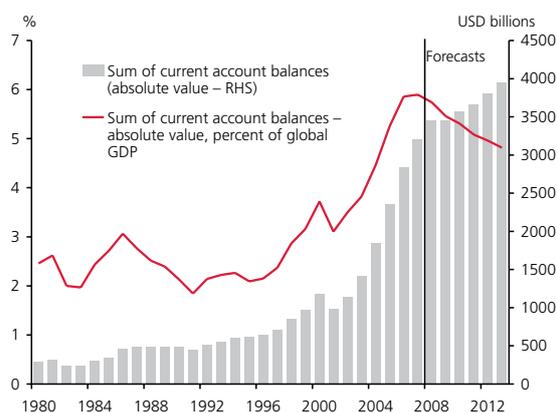
Since August 2007, the global economy has been subject to a sharp and adverse financial shock, with re-pricing of risk and higher cost of funds. This article argues that this shock is a consequence of an unsustainable period of global economic growth involving very large external imbalances. These imbalances – large current account surpluses in many emerging markets matched by current account deficits (CADs) in a number of advanced economies – contributed to an unsustainable cheapening of credit and increased risk-seeking behaviour by financial markets. The development of the imbalances can be explained by financial underdevelopment in many emerging markets, together with particular savings and investment dynamics across the surplus and deficit countries. These factors established 'Bretton Woods II', a global macro-financial dynamic that tied the deficit and surplus economies together in a co-dependent relationship. The current credit crisis appears to mark the limits of this relationship. However, the precise nature of any subsequent adjustment in global imbalances is not immediately clear.

1 Introduction

This article examines the relationship between the ongoing turmoil in financial markets, and the pattern of capital flows that has underwritten global growth in recent years. The global credit crisis that originated in the US sub-prime mortgage market can be understood as a consequence of the unsustainable nature of very large external imbalances that have evolved since the late 1990s (figure 1). The current deleveraging associated with the credit crisis therefore marks the beginning of the end of the broader economic and monetary configuration that has underpinned these imbalances. In short, the credit crisis signals the end to what, following Dooley *et al.* (2003), we will refer to as Bretton Woods II (BWII).

The term BWII is used to signify the mutually beneficial and co-dependent relationship between the world's largest economy (the US) and an emerging periphery.¹ This arrangement has allowed China and other emerging economies to pursue an export-led development strategy and run persistent current account surpluses, while enabling deficit economies such as the US to consume far more than their domestic income would otherwise allow. The sustainability of this global arrangement has been subject to debate within such global fora as the G7 and the IMF. The general consensus has been that while global imbalances could persist in the short run, BWII did not constitute an enduring architecture for long-term economic growth.²

Figure 1
Current account imbalances



Source: IMF, RBNZ calculations.

¹ The original Bretton Woods institutions established after World War II facilitated the economic development and re-emergence onto the world stage of Germany and Japan in the context of the geo-political leadership of the US. The term is used here more as a metaphor signifying the current symbiotic relationship between the US and a set of emerging market economies, rather than as a way of describing a set of specific institutions as in the post-War period. See Dooley, Folkerts-Landau and Garber (2003, 2004) for the original exposition of the BWII framework.

² This consensus position has been expressed in the IMF's multilateral consultation process around global imbalances, which has focused on the need for policy interventions on the part of both surplus and deficit countries in order to prevent a disorderly unwinding of the imbalances. For their part, Dooley, Folkerts-Landau and Garber have always seen BWII as a stable and durable regime. The present credit crisis has done little to deter them from this perspective - see Dooley *et al.* (2008).

Until recently, the resilience of the global economic expansion and associated optimism had meant that it was possible to overlook the more sober warnings about the non-sustainability of BWII. However, the financial shock that erupted last August in the sub-prime sector of the US housing market, and that has since spread throughout a heavily leveraged global financial sector, has given rise to concerns about the health of the global economy more generally. The “global economy is now facing a widespread deleveraging as mechanisms for credit creation have been damaged in both the banking system and the securities market – that is, both of the financial system’s twin engines are faltering at the same time” (IMF, 2008, pp. 6-7). Financial institutions in many OECD countries have become much more highly leveraged in recent years, reflecting the excess liquidity generated by global imbalances, financial innovation produced by an under-pricing of financial risk, and unsustainable growth in prices across a range of financial assets. In short, “the unsustainable has run its course” (BIS, 2008, p. 3).

In the next section, we situate the BWII system and underlying imbalances in historical context. Current account imbalances and the corresponding flows of financial capital have traditionally been a key mechanism by which countries have lent resources to other countries. At times, these cross-border flows of savings have ended badly for the borrowing countries, who have found themselves unable to service the debt – as in the 1990s, with a number of emerging market debt crises. Indeed, the Asian crisis of 1997-98 set the scene for the current export-led growth strategy of China and other emerging markets. This strategy is premised on the accumulation of reserve assets and an undervalued exchange rate.

Section 3 elaborates more fully on the current configuration of global imbalances and the contours of BWII. This section explains BWII as a result of the interplay between financial market underdevelopment in many emerging markets, financial globalisation and specific savings and investment dynamics. The elevated level of oil prices is highlighted as another key contributing factor to global imbalances.

The last section discusses how the ongoing turmoil in financial markets might signify a sea change in current global

economic and monetary arrangements and the concomitant demise of BWII. That said, it is by no means clear precisely how the adjustment in global imbalances will unfold at this point.

2 Global imbalances in historical context

‘Imbalances’ has a pejorative connotation, implying in some sense that ‘balance’ should be restored. However, there are a number of periods in economic history where global savings have flowed from one region to another, resulting in sizable current account imbalances.³ These include the era of the Gold Standard until 1914, the petro-dollar flows in the 1970s, the emergence of the US as a debtor nation in the 1980s, and the debt flows to emerging markets in the 1990s.⁴

Economic theory suggests that such transfers lead to the more efficient allocation of global capital, with the returns to capital assumed to be higher in the less-developed borrowing country.⁵ This ‘conventional’ view conforms to the direction of flows in the pre-WWI Gold Standard period where the core industrial economies of Britain, France and Germany financed the development of a resource-intensive periphery – Australia, Argentina, Canada and New Zealand, for example. The 1990s is another example, where capital flowed from advanced economies to the developing world.

³ For useful historical summaries, see Bracke *et al.* (2008), Brenner and Pisani (2007) and the IMF (2005).

⁴ Note, the global economic and monetary arrangements authored by the US after WWII – the so-called Bretton Woods system – did not allow a large-scale transfer of net savings between countries via the current account (Brenner and Pisani, 2007). The system’s *raison d’être* was to rehabilitate global trade within a system of stable exchange rates (based on the dollar standard) and capital controls. Countries that were having balance of payment difficulties were subject to revaluation of their currencies in order to prevent large current account imbalances. The large-scale transfer of saving that did take place was through the Marshall Plan, which saw around \$12 billion of US aid to reconstruct the war-ravaged economies of Europe and Japan.

⁵ The discrepancy in wages suggests that the returns to capital should be much higher in countries at an earlier stage in development, even allowing for factors likely to reduce the efficiency of productive capital.

At other times, however, capital has flowed mainly between advanced economies, as in the 1980s when Germany and Japan financed the US CAD – which peaked at 3.3 percent of GDP in 1987. In the 1970s, the dominant flows were between less-developed economies. The oil revenues generated by the oil price shocks were recycled through the financial intermediaries in the advanced economies, and on-lent to other developing countries.

The unwinding of these large transfers of global savings between countries has at times been associated with a painful period of adjustment for borrowing countries, although this has not always been the case. The Gold Standard era ended not because of difficulties that Australia and others had in servicing the financial obligations associated with their CADs, but because of an exogenous shock in the form of World War I. The imbalances of the 1980s were resolved via coordination between the US and the surplus countries without a slowdown in US growth.

By contrast, the imbalances of the 1970s corrected sharply in the 1980s following an increase in interest rates and the collapse of oil prices. The former prompted a series of debt defaults from borrowing nations, while the decline in oil prices caused a dramatic turnaround in the trade balances of oil exporters. In the 1990s, speculative attacks on a number of emerging market currencies proved the catalyst for capital flight and a debt crisis across emerging Asia. This followed a period of financial liberalisation and the dismantling of capital controls in the early 1990s, which saw a significant increase in inter-bank lending to the region. For the Asian banks, their borrowing was in foreign currency and their lending was in their national currencies, which meant they were exposed to the risk of sharp changes in the value of their exchange rate (although the pegging of their exchange rates dulled the perception of this risk at the time).⁶

The lessons learnt by the Asian economies during the financial crisis also set the scene for the emergence of today's external imbalances and the consolidation of the

BWII system. The region emerged as a net exporter of capital via an export-led development model that generated surpluses on the trade balance. Many Asian governments also viewed it as necessary to have a sufficiently large war chest of foreign reserves to prevent future speculative attacks on their currencies and capital flight.

3 Bretton Woods II

The emergence of the current pattern of external imbalances is quite different from past experiences of major global imbalances. Firstly, the direction of capital flows or net savings transfers is unusual. Capital is flowing 'uphill' from emerging markets to the advanced economies. Secondly, this global flow of net savings is taking place in a period of financial globalisation where the level of gross financial flows is unprecedented. Thirdly, current global imbalances have grown up in, and contributed to, a broader macroeconomic environment of remarkably high and stable growth, low inflation and reduced financial market volatility. However, this stability has proved temporary, as the vulnerabilities associated with the imbalances have contributed to the turmoil we are currently witnessing.

The imbalances on the deficit side have been concentrated primarily in one country – the US. The US is absorbing a significant fraction of the world's savings to finance its external deficit. By contrast, the world's current account surpluses are more dispersed.⁷

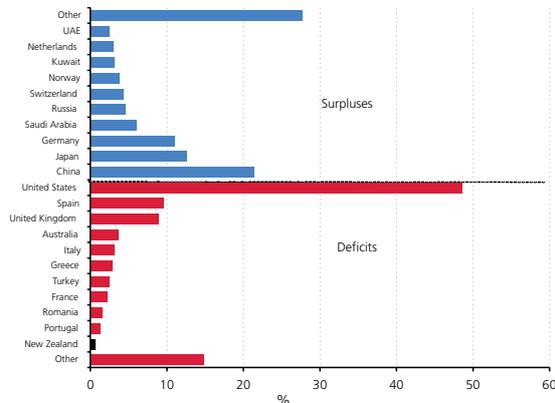
The counterpart to this pattern of current account balances is the net capital flow from the surplus to deficit economies and, more specifically, from the emerging markets to the advanced economies.

One way of initially rationalising this is by distinguishing between gross and net capital flows. The flow of cross-border

⁶ In addition, Asian financial institutions were exposed to the liquidity and credit risks associated with their domestic lending. These risks were compounded by poor risk management practices and deficiencies in broader governance arrangements.

⁷ In the mid-1980s, the US CAD was matched primarily by the surpluses of Japan and Germany, and the resolution of the external imbalances at the time was facilitated by the select number of countries involved. This time around, such coordination is more problematic given the greater number of countries involved on the surplus side, as well as the incentives underpinning BWII.

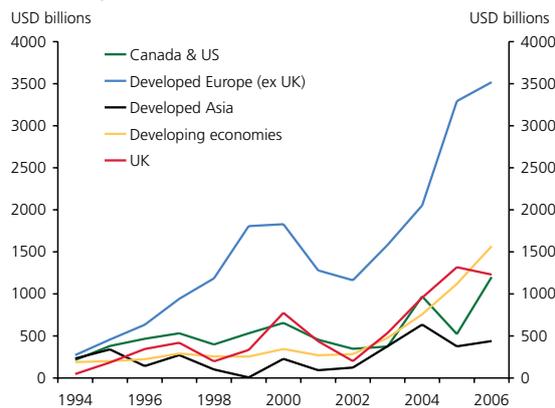
Figure 2
The distribution of current account balances (2007)



Source: IMF, RBNZ calculations.

capital topped USD8 trillion in 2006, or 17 percent of global GDP, up from 5 percent in 1995. This dramatic increase in cross-border flows – in the form of debt, equity and direct investment – is the embodiment of financial globalisation, where on-going technological change, financial innovation and domestic and international financial liberalisation of capital controls since the 1970s have combined to increase the gross level of assets held cross-border. The dominant ‘producers’ of international assets have been the advanced countries of Europe, which have provided large amounts of finance to Eastern Europe in particular (figure 3).

Figure 3
Gross capital flows

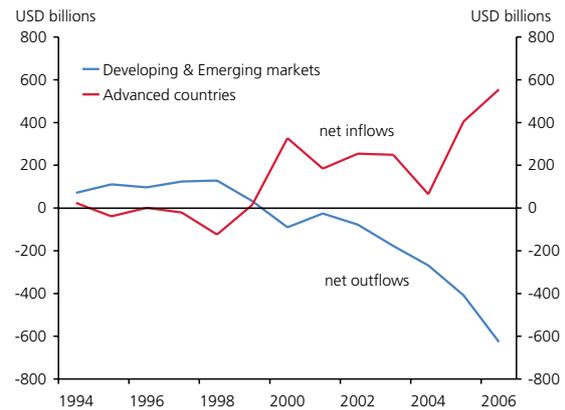


Source: IMF.

The share of gross capital flows from developing countries is small, but growing, driven by the current account surpluses of emerging Asia and the oil exporters. In addition, emerging market economies are still to a large degree recipients of these gross flows, in the form of foreign direct investment (FDI) to China for example, or in the case of emerging Europe,

bank lending.⁸ Indeed, FDI is still flowing the ‘right way’, where 40 percent of private flows to emerging markets are FDI (Prasad, Rajan and Subramanian, 2007). However, when all forms of financial flows are taken into account, there has not been a net transfer of capital from rich to poor countries (figure 4).

Figure 4
Net capital flows



Source: IMF.

In short, financial globalisation cannot, by itself, explain the increase in net flows from emerging markets to the developed world. Emerging Asia and the oil-exporters are the dominant suppliers of capital in net terms. Explaining this pattern of net capital flows that underpin current account imbalances is the essence of BWII, which will be elaborated below.⁹

There are a number of interrelated factors that, taken together, explain the emergence of global imbalances and

⁸ Eastern Europe has been the recipient of large financial flows in the context of the transition of its economies from a socialist to a market-based model of development, which has required a large overhaul of their capital stock. Moreover, optimism surrounding the growth prospects of these countries has been buoyed by membership in the EU and associated convergence with Western Europe (Rahman, 2008).

⁹ Note, global imbalances can also be mapped by examining the stock of international assets and liabilities, where capital account flows corresponding to the current account balances change the stock of existing international assets and liabilities. The net international investment position data broadly follows the pattern of capital flows, although there are important valuation effects associated with capital gains on assets as well as with exchange rate changes. These valuation effects have meant that the US’ net international position has not deteriorated to the extent implied by the CAD flows. For example, the US’ share of total international financial liabilities is 21 percent, which is much smaller than its share of the global CAD (just under 50 percent - figure 2).

the broader BWII configuration. These include: financial sector imperfections and the role of the US as a key financial intermediary; saving and investment dynamics in the particular borrowing and lending countries; and the increase in oil prices.

The first explanation relates to the nature of financial market imperfections in the context of the pattern of capital flows described above. On the one hand, financial globalisation has created an environment where borrowing and lending has become less restricted. This has led to the decline in the home bias of investment and the diversification of portfolios across countries and asset classes. On the other hand, financial market underdevelopment in emerging markets implies that the domestic savings generated by productivity increases in these economies is not adequately intermediated via the local financial system into increases in consumption. In addition, a heightened degree of uncertainty can lead to over-saving, since the pooling and distribution of risk that well-developed financial markets provide is absent (Valderama, 2008). The under-provision of public goods such as social security and public health and education systems in many emerging markets can lead to very high household savings rates, and relative under-consumption.¹⁰ This precautionary savings motive is magnified at the economy-wide level by the desire on the part of emerging market governments to avoid a repeat of the currency crises of the 1990s, leading them to hold sufficient foreign exchange reserves to avoid a balance of payments crisis.

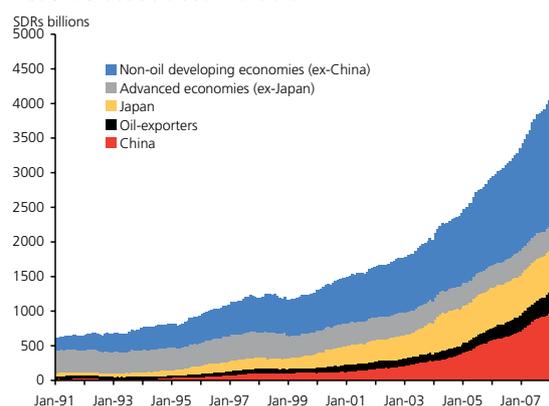
The excess savings generated by this precautionary motive, and mediated by financial underdevelopment, must end up somewhere. This somewhere has been the US. The US is an important producer of financial assets, including 'safe assets', given the depth of its financial markets, low inflation and the protection afforded to property rights. As foreign savings have increased, the need for safe assets to store value from political and economic turbulence has also increased. In this context, the US has been the key destination for this

¹⁰ By contrast, productivity increases in economies with well-developed financial markets can more easily be translated into consumption, as households are able to borrow in anticipation of future income increases, and hence smooth their consumption behaviour. This access is further enhanced by financial innovation and the development of new financial products.

'excess savings' generated by emerging markets. According to Zhang and Miller (2007), the US is exporting the security of ownership in exchange for manufactured goods.

The specific mechanism for this savings transfer has been central bank reserve accumulation and the recycling of petro-dollars via the Sovereign Wealth Funds of the oil exporters. The growth in reserve accumulation has been dramatic over the past few years. Foreign exchange reserves as measured by the IMF are SDR4.3 trillion, or USD6.8 trillion (figure 5).¹¹ China's official central bank holdings alone are USD1.8 trillion.¹² Indeed, one key marker of the stability of BWII would be the continued preference of foreign central banks to hold low-yielding US government debt, which is the primary reserve asset of choice.

Figure 5
Reserve asset accumulation



Source: IMF.

In recent years, official capital inflows to the US have financed an increasingly large portion of the US CAD compared to net private capital inflows.¹³ The concern has always been how these official flows would hold up in the context of

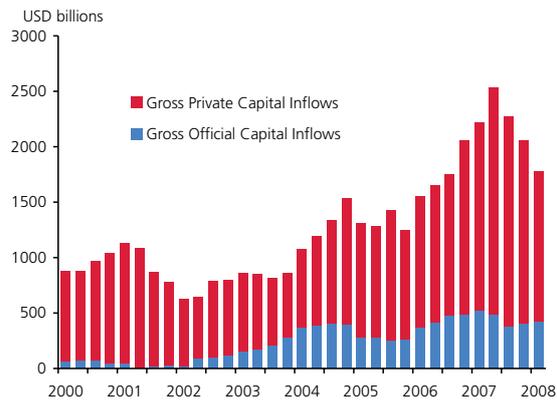
¹¹ Data is for April 2008. An SDR, or special drawing right, is a composite currency used by the IMF based on a weighted average of major currencies. As at 8 August, 1USD = 0.63SDR.

¹² The total Chinese government holdings of reserves are likely to be even higher, given the recent creation of the China Investment Corporation (CIC) – a sovereign wealth fund. In addition, state banks are required to hold a level of foreign reserves as part of their reserve requirements. Brad Setser estimates that the Chinese government probably manages between USD2.4-2.5 trillion in foreign assets [see his blog, 'Follow the Money', <http://blogs.cfr.org/setser/>].

¹³ As many have pointed out, the level of official inflows to the US is probably understated, since a proportion of asset accumulation by central banks and Sovereign Wealth Funds shows up as private capital flows after intermediation directly by capital markets in third countries.

capital flight on the part of private investors as the USD falls. To date, these official flows have held up, preventing any disorderly depreciation of the dollar and holding down US interest rates at a lower level than otherwise would be the case (figure 6).

Figure 6
US capital inflows



Source: Datastream.

That said, a number of emerging markets have realised that the ongoing depreciation of the USD inevitably implies capital losses on their holdings of USD assets. Since 2000, ten new sovereign wealth funds (SWFs) around the world have been created to invest in higher-earning assets, including equities (Gieve, 2008).¹⁴ SWFs have around USD2–3 trillion under management. Any portfolio diversification away from US assets would prompt further dollar depreciation and higher US interest rates.

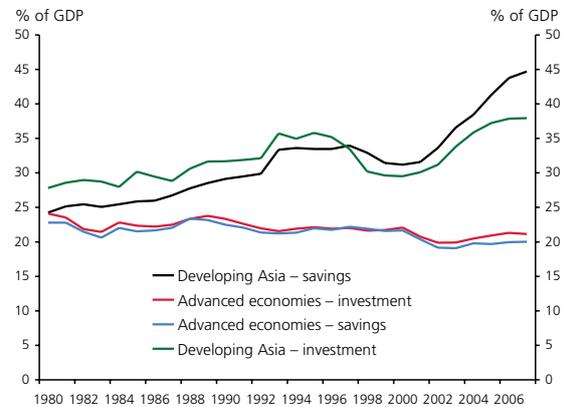
A second explanation for global imbalances relates to specific savings and investment dynamics in both the deficit and surplus countries. The difference between national savings and domestic investment is the analytical counterpart to current account balances. If domestic savings is insufficient to meet desired investment, the shortfall must be met by the importation of global savings.

From figure 7 one can see an increase in savings in emerging Asia that has outpaced investment since the late 1990s. We noted above the precautionary motives for an increase in public savings as protection against capital flight, together with the increase in household savings due to financial sector

¹⁴ There are of course, political economy issues related to this ‘reverse FDI’, just as there were in the 1980s with Japanese FDI into the US. The Unocol and Dubai World Ports cases are illustrative in this regard.

underdevelopment and more general uncertainty associated with the economic reforms.¹⁵

Figure 7
Global savings and investment



Source: IMF.

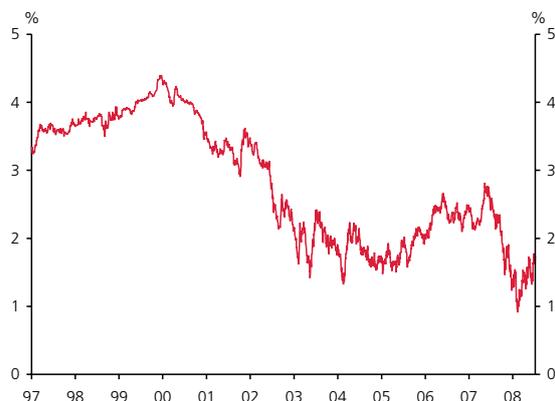
In the advanced economies, there has been a secular decline in both savings and investment, with the savings falling more than investment – resulting in the reliance on foreign saving to finance the desired level of domestic investment. The long-term decline in savings in advanced countries can be explained by the following factors (IMF, 2005): increased access to credit facilitated by financial market innovation; the decline in public savings in some advanced economies such as the US; and an increase in the elderly dependency ratio, where an aging population tends to dissave during retirement. On the investment side, long periods of subdued growth in Europe and Japan, together with demographic trends, have reduced desired investment for industrial economies as a whole.

All else equal, the gap between desired investment and domestic savings in the advanced economies should lead to an increase in long-term interest rates (Bernanke, 2007). However, the dramatic increase in savings from the rest of the world, and the intermediation of this saving through US financial markets, has had the effect of depressing US and global interest rates.¹⁶

¹⁵ In addition, investment levels in Asia (ex China) have not recovered from the Asian crisis. In this regard, there are elements of both a savings ‘glut’ and investment ‘slump’, both of which explain the pattern of current account surpluses in the region.

¹⁶ The large increase in desired savings has not been the only factor behind the decline in real long-term interest rates. Other factors include the decline in the term premium due to the decline in uncertainty that is associated with a low-inflation environment.

Figure 8
US real long term interest rates



Source: Bloomberg.

This decline in long-term interest rates, coupled with relatively loose monetary policy settings in the US immediately following the dotcom crash in 2001, has accentuated the imbalance in the US between savings and investment. US households have been able to sustain high levels of consumption relative to their incomes because of this low interest rate environment. Moreover, household wealth over this period increased as the prices of assets such as property were buoyed by the benign financial conditions. The decline in household savings in the US has been compounded by government dissaving.

More specifically, the global savings glut emanating from the increase in the net supply of capital from the rest of the world has been instrumental in an unbundling and re-pricing of risk within financial markets. Excess global liquidity contributed to the development of new markets and financial products designed to generate a return on this liquidity. The massive growth of securitised debt products – such as residential mortgage-backed securities – is indicative in this regard. In turn, the propagation of such new financial instruments has further increased liquidity growth.

Oil prices are another important element underlying current global imbalances. Oil prices have increased dramatically over the past few years on the back of robust demand from emerging Asia to fuel its rapid industrialisation. Higher oil prices cause a deterioration in the trade balances of oil importers, and a windfall for oil exporters. For example, at USD120 a barrel, the six-country Gulf Cooperation Council (GCC) is earning around USD2-2.5 billion a day

(Jen, 2008).¹⁷ While some of this windfall is being spent on domestic infrastructure and other projects, the majority of this oil revenue has been recycled back to oil importers via the investment of accumulated reserve assets, as described above.

In sum, BWII has allowed many emerging markets to foster a specific economic development model based on export-led growth, while permitting the US to import capital and spend more than the economy produces. This co-dependency helped create a benign global financial environment that contributed to rapid financial innovation – a development that itself reinforced the imbalances.

4 Financial market turbulence and Bretton Woods II

As discussed above, the excess liquidity related to global savings and investment imbalances served to underpin a very strong period of global growth. Low global interest rates and subdued financial market volatility reinforced investor confidence and facilitated the development of financial products to reward risk-seeking behaviour in new ways.

However, this period of financial innovation and risk appetite has come to an abrupt end. The US economy is currently experiencing a sharp slowdown as the housing market corrects, while credit concerns have extended well beyond the market for structured products based on residential mortgages. The crisis in the US sub-prime mortgage market has become a full-blown global credit crisis, where both the cost of credit and risk aversion has increased. Financial institutions are experiencing severe balance sheet pressures as a result of their exposure to risky financial instruments, and liquidity pressures more generally. The prices for financial assets have fallen sharply, and spreads on both risky and non-risky assets have blown out. The cost of purchasing insurance against financial market volatility has increased sharply as a result.

To date, most analyses of this financial market turmoil have focused on the market segments where it all began (BIS,

¹⁷ Jen estimates that at \$120 per barrel, the GCC has about \$58 trillion in proven oil reserves, non-GCC OPEC \$53 trillion and others \$14 trillion.

2008). Here, the problems associated with the 'originate-to-distribute' model of financial intermediation have been emphasised. This model allowed banks to expand their lending without violating capital requirements imposed by regulators. Banks were able to on-sell loans to investors, or offload the loans to separate entities that the banks created for that purpose – the so-called 'structured investment vehicles'. Directing these loans off balance sheet enabled banks to issue even more loans – loans that were increasingly risky since these attracted higher fees for the originating banks. Therefore, much analysis associated with the credit crisis has been focused specifically on the highly innovative structured credit products, their encouragement by rating agencies, and the way banks shifted these products 'off balance sheet' in order to reduce their use of regulatory capital (BIS, 2008).

However, a broader perspective suggests the current financial market turmoil is an outcome of an unsustainable period of credit growth intimately tied to the BWII system. The credit crisis therefore represents a 'Minsky moment' – a moment of recognition and recoil that is prompting reflection on the broader economic and monetary arrangements associated with BWII (BIS, 2008; UBS, 2007).¹⁸

A growing number of commentators have begun to explore the connection between current developments in financial markets and the imbalances that have underwritten the global boom.¹⁹ For Münchau (2008), the crises unfolding in credit and property markets, as well as developments in food and other commodity prices, are all part of the same narrative of a liquidity-driven global boom. BWII, in the words of Münchau, has been a "gravity-defying design", which has allowed the US to run a CAD and the emerging markets to recycle their trade surpluses back into the US, increasing various asset prices and encouraging financial institutions to take excessive risks.

For Roubini (2008), BWII has always been a disequilibrium for emerging Asia, where the entire Asian development

model has been based on sustaining US consumption. The limits of this system have now become more apparent, and reflected in accelerating inflation and pressures for currency appreciation in a number of emerging markets.²⁰

China's export-led development model has been premised on pegging its currency to the USD at an undervalued rate in order to generate trade surpluses and accompanying foreign reserves. Fixing an exchange rate to prevent appreciation requires intervention on the part of monetary authorities. The central bank must be prepared to purchase all the dollars coming into the country, as a result of either export receipts or from capital flows. To prevent an increase in the domestic monetary supply stemming from this intervention, the authorities can attempt to sterilise the effects on the domestic money supply by issuing government bonds, or increasing the reserve requirements of financial institutions.

However, this sterilisation can rarely be complete. The capital flows coming into China have fuelled growth in bank lending to the private sector. These flows are increasingly taking the form of 'hot money' flows in anticipation of the eventual appreciation of the Chinese currency.²¹ Most of this hot money is going into Chinese bank deposits, as opposed to property or into equities, as the nominal return on bank deposits is higher than in the US. Thus, international investors seem to be increasingly of the view that the arrangements of BWII are unsustainable. At some point, the capital losses on Chinese reserve holdings of US assets, and the growing inflation problem will prompt a substantial revaluation in the exchange rate. Inflation is also a problem for oil exporters, with most of the Middle Eastern countries pegged to the USD. Fixing a currency has the added problem of abrogating control of domestic monetary conditions. By pegging to

¹⁸ This is named after US economist Hyman Minsky, whose work in the 1960s and 1970s attempted to understand the relationship between speculative bubbles and financial crises.

¹⁹ See, for example, Münchau (2008), Roubini (2008), and Wolf (2008).

²⁰ This view contrasts with that of Dooley *et al.* (2008). For these authors, it is the short-term desire on the part of the Chinese authorities to avoid social unrest and generate the level of economic growth sufficient to absorb the excess supply of rural labour that will hold BWII together for the foreseeable future. Asian central banks will continue to accumulate low yielding US Treasuries, and any appreciation of the renminbi will not be enough to fundamentally alter the pattern of global current account balances. The credit crisis is interpreted here as specific to the nature of financial innovation that has occurred over the last few years, as opposed to embodying a consequence of BWII regime per se.

²¹ *The Economist*, "Hot and Bothered", June 26.

the USD, however loosely, many emerging markets are effectively importing the loose monetary conditions of the US economy as the Federal Reserve cuts rates in response to a slowing economy and credit market turmoil.

Thus, the limits to BWII are not being expressed as a debt crisis for emerging markets as in 1997-98, but as an overheating problem reflected in the appreciation in the real exchange rate via higher inflation.²² The short-term objectives of the US and the key emerging markets are becoming misaligned, removing the incentives that have underpinned the co-dependent nature of BWII. Over the longer term, this misalignment will be more obvious. Arguably, the desire for sufficient reserves to satisfy precautionary demand has been met, while policies focusing on enhancing domestic demand would create a more balanced economy, and one less reliant on net export growth. These other policies include financial sector reforms associated with the development of mortgage and credit markets, together with an expanded social security system to reduce precautionary savings.

If the credit crisis in the advanced economies and overheating in emerging markets do indeed reflect the limits of BWII – the argument presented here – then what will the subsequent adjustment of global imbalances entail? The answer to this question, unfortunately, is more open-ended.

On the one hand, global imbalances could persist for some time without significant correction despite the on-going re-pricing of risk in financial markets. Admittedly, the housing-induced slowing of the US economy, coupled with the depreciation in the USD exchange rate to date, has reduced the large US CAD from its peak of 6.2 percent of GDP, to 5 percent presently.²³ However, high oil prices have prevented further correction in the US trade balance, while sustaining the surpluses of the oil exporting countries. Furthermore, the US continues to be able to attract the requisite capital flows necessary to fund its current account, despite significant depreciation of the US exchange rate to date. This reflects

both the US' role as a safe haven in times of risk aversion, and the apparent desire of many emerging markets to maintain export competitiveness.

Indeed, current financial market concerns may lead to a recomposition of global imbalances, rather than their attenuation (Lipsky, 2008). Global risk aversion could lead to the unwinding of the external positions of heavily indebted peripheral countries, including New Zealand. Moreover, with limited exchange rate appreciation from key surplus countries, the adjustment of the US current account to date has been against other floating currencies such as the euro.

On the other hand, the sub-prime crisis may suggest to financial market participants that the superior intermediation capacity of the US has been overstated (Aizenman and Sun, 2008). The willingness of emerging markets to place their domestic savings in the US financial system in the form of US government debt could then be in question, particularly if the export-led model of economic development is no longer viewed as optimal. Much will depend on the outcome of policy debate within emerging markets as they are confronted with both domestic inflation pressures, and a sharply slowing global economy, which will reduce export growth.

Empirical evidence on current account adjustment suggests that instances of large and sustained deficits and surpluses are rare.²⁴ Countries do not seem able to run either deficits or surpluses for a sustained length of time. There are exceptions, and both New Zealand and Australia are relevant in this respect. Both economies have been able to run CADs in the range of 4-5 percent or more for a least a decade.

Past episodes of CAD reversals have been associated with both exchange rate adjustment and a slowdown in GDP growth. The IMF notes that movement in the exchange rate can help to smooth the adjustment – the greater the adjustment in the exchange rate, the lower the loss in output growth. This indicative evidence from past episodes has been central to the IMF's multilateral consultations on global imbalances, which have stressed the need for a combination of exchange rate adjustment, together with other policies designed to

²² Although emerging markets taken as a whole are running current account surpluses, a number of emerging markets do have CADs, with a high percentage of short-term debt. Emerging markets with dependence on cross-border bank finance, such as the Baltic and South Eastern Europe economies, might find themselves under increasing liquidity pressure.

²³ As at Q1 2008.

²⁴ See, for example, Edwards (2005, 2006 and 2007) and the IMF (2007).

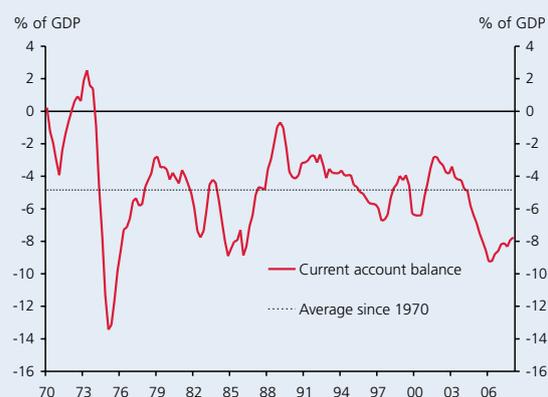
Box 1

New Zealand's external imbalances

In absolute terms, New Zealand's external imbalances are insignificant in the overall schema of global imbalances. New Zealand's share of the global CAD is just 0.7 percent, compared to the US' share of just under 50 percent (see figure 2). New Zealand has not, therefore, played any active role in the emergence of BWII *per se*, nor will it play any role in the fundamental resolution of global imbalances. Nevertheless, relative to GDP, New Zealand's external imbalances are large, and the deterioration in our external position since 2001 has, in part, been enabled by the dynamics of BWII. In addition, the unwinding of imbalances at the global level could well affect the rebalancing of the New Zealand economy.

Figure 9

New Zealand current account balance



Source: Statistics New Zealand.

From 2001 to 2006, New Zealand's CAD deteriorated 6.4 percentage points to -9.3 percent of GDP.²⁵ The deterioration in the deficit since 2001 can be partly attributed to an increase in business investment, and the high demand for imported capital (Bollard, 2005). However, the more important driver of this deterioration has been an increase in household spending and a corresponding run-down in household savings.

Rising house prices in the context of a low interest rate environment have enabled households to unlock housing

²⁵ The recent slowdown in economic growth, coupled with a depreciation in the exchange rate, has since seen the deficit correct modestly to -7.3 percent of GDP (as at Q1 2008).

equity built up via capital gains to fund consumption. New Zealand's domestic savings have been insufficient to fund the desired level of investment in housing, and New Zealand has had to borrow from abroad to fund the shortfall. The primary conduit for accessing global savings has been bank borrowing from overseas capital markets.

The excess global liquidity described in section 3 has thus been an enabling factor in New Zealand's savings and investment imbalance.²⁶ New Zealand banks have, until recently, been able to access funds at a very low cost, given the downward pressure placed on global interest rates by the global savings glut. This abundant global liquidity reduced pressure on market interest rates in New Zealand, and encouraged borrowers to take out loans at lower rates and at a longer maturity.²⁷ In addition, the global search for 'yield' prompted by the benign global financial conditions increased the foreign demand for NZD assets and placed upward pressure on the exchange rate (Bollard, 2007). Exchange rate appreciation, coupled with lower interest rates, exacerbated the imbalance between the non-traded and traded sectors in New Zealand, further widening the CAD.

These benign domestic financial conditions have not lasted. Turbulence in financial markets that began last August has increased the cost of borrowing for New Zealand financial institutions, and has been passed on to households in the form of higher retail interest rates. The current correction in the housing market is a manifestation of an unwinding of New Zealand's recent pattern of unbalanced growth. The necessary increase in domestic saving relative to investment required to correct the CAD may not be painless for households, given the declines we are witnessing in house prices and therefore household wealth.

²⁶ As recent RBNZ research shows, New Zealand's large CAD is "a rational response to a low cost of capital resulting from high savings in other countries" (Munro and Sethi 2007, p. 2).

²⁷ This shift to the longer end of the yield curve was further encouraged by the RBNZ's efforts to combat rising inflation pressures by increasing short-term interest rates. Higher short-term interest rates relative to offshore rates also encouraged capital inflow and placed upward pressure on the exchange rate.

address specific savings and investment imbalances across the deficit and surplus countries. If done successfully, these policy interventions would produce the preferred orderly adjustment of global imbalances.

Thus, the ability and willingness of both surplus and deficit countries to address their responsibilities under the IMF's framework in the context of current macro-financial turmoil will be key to how global imbalances will adjust in the near term.

5 Conclusion

The global economy is currently subject to what the IMF has described as the largest financial shock since the Great Depression (IMF, 2008). This financial shock marks the end to the benign global financial environment witnessed over the past few years – an environment where the interplay between excess global savings and financial innovation led to a general under-pricing of risk.

This article has argued that the credit crisis also represents the limits to the broader global economic and monetary arrangements we have labelled BWII. BWII embodied a fairly short-term mutually beneficial relationship between some key emerging markets and the US. The net capital flow from emerging Asia and oil exporters to the US that BWII entailed has resulted in the accumulation of very large external imbalances. And while history shows that large external imbalances are not uncommon, they seldom last indefinitely.

History also suggests the correction of large external imbalances can, but not always, lead to a painful period of economic adjustment. This disruptive scenario has always been a key risk for the global economy. This risk now seems more tangible in today's environment of macro-financial fragility.

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A user's guide to credit ratings

Doug Widdowson and Andy Wood

This article explains how credit ratings can be used by individual investors to make informed investment decisions, and the benefits of credit ratings to the financial system. A credit rating is an independent assessment of the financial capability and willingness of an entity to meet its financial obligations as they fall due (i.e., its creditworthiness). The obligation to disclose credit ratings has been a feature of New Zealand's prudential supervision of registered banks since 1996. It became mandatory for all banks to have a credit rating from an approved rating agency in 2002. Similar obligations have been introduced for most non-bank deposit takers, and Cabinet has recently decided to require all insurers (not just disaster and property insurers) to obtain credit ratings in the future. Credit ratings play a useful role in encouraging sound management of financial institutions and in supporting market participants' ability to make informed choices about credit risk. Notwithstanding these benefits, and the usefulness to investors of credit ratings as a simple measure of credit risk, investors need also to be aware of the limitations of ratings. We highlight some of the key issues that investors should consider when using ratings as a tool in their decision making.

1 Introduction

This article explains how credit ratings can be used by individual investors to make informed investment decisions, and the benefits of credit ratings in improving the soundness and efficiency of the financial system. Since 1996, the Reserve Bank has required every registered bank with a rating from an approved credit rating agency to disclose the rating in its quarterly disclosure statement. In 2002, the Bank made it mandatory for every registered bank in New Zealand to obtain a credit rating from an approved rating agency.

The obligation to obtain a credit rating from an approved agency has recently been extended to non-bank deposit takers (e.g., finance companies and building societies), with effect from 1 March 2010.¹ Cabinet has also decided to introduce credit ratings as a key component of the prudential regulation of insurers that is currently being developed.²

Section 2 of this paper discusses what credit ratings are. In section 3, we outline some of the key issues that investors should consider when using ratings as a tool in their decision making. In section 4, we explain the benefits that credit ratings can provide to the financial system more generally. Section 5 concludes.

2 What are credit ratings?

Credit ratings produced by the major credit rating agencies aim to indicate the relative creditworthiness of entities – i.e., their ability to meet their debt-servicing obligations.

A credit rating gives investors and analysts an estimated likelihood that the issuer will be able to meet its financial obligations on time and in full (e.g., to fully repay a loan). A poor credit rating indicates a higher risk of non-repayment (default). All other things being equal, a higher risk of default should lead an investor to demand a higher rate of return in recognition of the additional risk. Ultimately, the investor may refuse to provide funding if the investor views the default risk to be too high to bear.

Ratings agencies synthesise and simplify a wide variety of complex risk factors into a single measure that allows investors, customers and suppliers to assess relative creditworthiness or financial strength. Credit ratings take into account both quantitative and qualitative factors. Financial measures are a core component of any rating, but ratings will also consider a range of economic, industry and business fundamentals, including the quality of an institution's risk management and governance structures.

A rating represents the rating agency's independent opinion of an institution's or a product's creditworthiness. Different agencies employ different rating methodologies, but they all essentially seek to capture the likelihood of default over any given period. Institutions and products viewed as

¹ This obligation is included in the Reserve Bank of New Zealand Amendment Act 2008 (No. 59).

² This cabinet paper is available on the Reserve Bank's website.

stronger by the rating agency will be given a stronger rating, according to the rating agency's own scale and approach to assessing creditworthiness.

It should be noted that, while ratings are useful indicators of relative credit risk (the risk of one entity or issue versus another), they are not precise measures of the absolute level of that risk. Rating agencies will have some view of the default probability attached to a particular rating level, but the probability of default associated with a rating cannot be known in advance. This contrasts with the throw of a die, say, where the probability of a given number is known to be one in six. With a long track record of ratings and experience of some rated entities failing (a 'default rate history'), one can estimate the probability of default for a specific rating class – and thereby draw an indicative relationship between ratings classes and the probability of default. However, because defaults tend to be quite infrequent at the higher

rating levels, this is always going to be inexact.

It should also be noted in this connection that even a triple A-rated organisation could default in the future, even if very few defaults of such entities have occurred over history. Investors should not see a strong rating as a guarantee of survival, though it can be said with more confidence that a strongly rated entity is more likely to survive than a more weakly rated one.

Comparability of ratings is important for all users. Although ratings agencies use different rating methodologies, and there are technical distinctions in what components of default are being covered (e.g., probability of default or expected loss),³ market participants commonly map the rating scales of the three major international ratings agencies for comparability and ease of use. Table 1 below groups and ranks the ratings classes of the three major

Table 1
Standardised rating scale

	Description	S&P Scale	Moody's Scale	Fitch Scale	Approx. probability of default over 5 years*
Capacity to make timely payment	Extremely Strong	AAA	Aaa	AAA	1 in 600
	Very Strong	AA	Aa	AA	1 in 300
	Strong	A	A	A	1 in 150
	Adequate	BBB	Baa	BBB	1 in 30
Vulnerability to non payment	Less Vulnerable	BB	Ba	BB	1 in 10
	More Vulnerable	B	B	B	1 in 5
	Currently Vulnerable	CCC		CCC	
	Currently Highly Vulnerable	CC	Caa	CC	1 in 2
	Default	D	C	D	

* The approximate, median likelihood that an investor will not receive repayment on a five-year investment on time and in full based upon historical default rates published by each agency.

³ Expected loss refers to an estimate of the amount of the exposure at default that will be lost (i.e., not recovered), together with the probability that this could occur. This quantity includes other economic costs (e.g., legal costs). Expected loss is influenced by characteristics of the obligation, such as the presence of collateral and the degree of subordination.

international ratings agencies operating in New Zealand (Standard & Poor's, Moody's Investors Service, and Fitch Ratings).⁴ The approximate probabilities in the table are derived from the agencies' published historical default rates for each alphabetical rating category.⁵

This table shows the significant differences in the approximate probability of default between, say, a AAA-rated entity (1 in 600 over five years) and a C-rated entity (1 in 2 over 5 years).

Types of ratings

There are a number of types of ratings. The two most relevant to this paper are issuer and issue credit ratings. An issuer credit rating is an indication of the rating agency's view of the creditworthiness of an organisation or sovereign nation. An issue credit rating relates to a specific financial obligation or a specific class of financial obligations issued by an institution or nation.

An issue rating takes into consideration the credit rating of the underlying issuer, the creditworthiness of any guarantors, insurers, or other forms of credit enhancement on the obligation, the currency in which the obligation is denominated, its standing in bankruptcy or liquidation and the legality and enforceability of the obligation.

Reserve Bank prudential rules require all New Zealand registered banks to obtain and maintain a current credit rating applicable to their long-term senior unsecured obligations payable in New Zealand, in New Zealand dollars.

A note on the term 'investment grade'

Market commentators and investors frequently use the term 'investment grade' when describing financial investment opportunities. This term gained prominence when US regulators imposed a minimum level of creditworthiness for investments that regulated institutions could hold for

prudential purposes. It was a US term imposed for specific US regulatory requirements. However, since then, the term has gained general currency as a shorthand description of ratings of BBB (Standard & Poor's and Fitch) or Baa (Moody's) or better. It is a commonly used benchmark: some investment funds are only permitted to invest in 'investment grade' issues.

For other investors, the distinction between investment and non-investment grade is arbitrary, in that it is ultimately up to the individual investor to decide what level of credit risk to take on and what level of return to demand for that risk. Various other terms have been used to describe non-investment grade credits – for example, 'high-yield', 'speculative' and 'junk'. These terms are simply alternative shorthand for non-investment grade obligations.

3 The limitations of ratings

Although ratings provide benefits for investors and advisers, users should be aware of the limitations of ratings. In particular, investors should understand that ratings are not guarantees of future performance, nor can they ever be perfect predictors of default. Rather, they are intended merely to be broad indicators of the relative credit risk of an institution over the medium term compared to other rated entities.

Ratings and the current international credit market disruption

Recent rapid downgrades of the formerly investment-grade ratings of highly complex financial instruments have called into question the integrity of credit rating agencies and the reliability of ratings for complex financial instruments. In the US, the President's Working Group on Financial Markets (PWGFM; Department of the Treasury *et al.*, 2008),⁶ in its report in March 2008, found that there were faulty assumptions in the underlying rating methodologies of the agencies involved in rating these instruments. The PWGFM

⁴ AM Best is also an international agency operating in New Zealand, but it is generally used for insurance credit ratings. AM Best does also issue ratings on deposit-taking financial institutions, although to date not in New Zealand.

⁵ Fitch Ratings Ltd (2007); Moody's Investors Service (2007); Standard & Poor's (2007).

⁶ The PWGFM was established in 1988 in response to the stock market crash of 1987.

recommended that the agencies reform the processes and practices regarding the rating of structured products.

By contrast, the ratings typically required by regulators relate to relatively simple obligations (deposits) issued by relatively simple financial institutions (banks and deposit takers). It is this type of rating that the Reserve Bank continues to use as a supervisory tool. These types of ratings have been the core business of ratings agencies for decades, and there is no reason to believe that such ratings are questionable in the same way as ratings on complex financial instruments (SEC, 2008). The PWGFM made no recommendations regarding ratings processes for simple obligations and issuers.

As a result of the questions being asked about the credit rating process, agencies have significantly improved their risk management and ratings processes. This should result in an overall improvement in the quality of ratings generally.⁷

Ratings cannot predict individual failures

Rating agencies do not pretend to be able to predict the failure of individual entities. The historical data suggests that ratings are reasonably reliable broad indicators of risk. They are therefore most useful when looking at the performance of a portfolio of investments.

Ratings are by their nature probabilistic. For example, the historical probability of default associated with a AAA-rated entity, while small, is not zero. In a portfolio of 600 separate AAA entities, an investor could expect one to fail, on average, every five years, based on the default histories summarised in table 1. A failure of a highly rated entity is therefore neither inconceivable, nor ruled out by a AAA rating from a rating agency.

Ratings do not always adjust in a timely manner

Agencies do not adjust their ratings on a frequent basis. This is a deliberate policy to ensure that ratings are only changed when there is clear evidence of a longer-term change in the risk profile of a rated firm, and that the change is likely to

be permanent. Ratings agencies attempt to 'look through' short-term fluctuations in an attempt to more correctly reflect the longer-term risk of a firm (SEC, 2008). This is to ensure that the rating is a correct and accurate reflection of the relative ranking of risk of a firm on average over time, rather than reflecting the circumstances of a particular time period. This is important for investors to understand. Ratings will not allow investors to predict change – merely to understand the relative level of risk of the firm over the longer term. The downside is that ratings can appear to be, and often are, slow to react in response to changes in a firm's risk profile.

Different ratings scales

Perhaps the most important issue for retail investors is to become familiar with the alphabetical systems of ratings outlined in table 1. In particular, there is no correlation between alphabetical credit ratings and grading systems that are used in schools, for example. Whereas a 'B' grade may have been a good outcome at school, a 'B' grade credit rating indicates an institution that has an approximately 1 in 5 chance of not paying back its obligations on time over a five-year period. By contrast, an A rating indicates a chance of obligations not being paid back of about 1 in 150, a much lower probability.

Furthermore, each agency has its own unique proprietary process for determining a rating, which can only be approximately compared with another agency's process. The default histories for each ratings class are the best tool to allow comparison between scales, bearing in mind that even these histories provide a generic sense only of the risks.

Ratings of smaller institutions

Investors should also realise that the methodology applied by ratings agencies means that smaller and less diversified financial institutions, such as regional deposit takers, will generally receive a lower rating than national institutions of greater scale. This reflects the fact that scale and diversification are effective buffers against credit risk. It also reinforces the need for depositors to consider other factors in addition to ratings when making investment decisions. In

⁷ SEC (2008) discusses recent reviews of rating agencies in more detail.

some cases, there may be sound reasons to invest in local institutions, notwithstanding a relatively low credit rating. It may also be the case that the rate of return offered to the investor may be sufficient to compensate for the risk that is disclosed. Low credit ratings do not mean that investors should ignore such entities – merely that they should invest with care and demand a sufficient reward for the risk being undertaken.

Rating agencies do not undertake an audit

A practical limitation of the rating process is that agencies rely heavily on information that is provided to them by the financial institution under review. Agencies do not independently verify the accuracy of this information. Accordingly, agencies rely on a free flow of information from the entity seeking a rating. This is especially important in changing economic times. A corollary of this reliance on management is that rating agencies will not necessarily detect misleading information that is provided inadvertently or fraudulently.

Public awareness of ratings

There are valid concerns about the current level of public awareness and understanding of credit ratings. In a 2007 survey by the Reserve Bank, about 38 percent of respondents indicated that they were either not aware of, or had little awareness of, credit ratings (Widdowson and Hailwood, 2007). Nevertheless, credit ratings remain a valuable comparative tool for investors. The same survey identified that, once ratings were explained to investors, around 80 percent indicated that credit ratings would be helpful in their investment decision making. A poll conducted by the Association of Financial Professionals indicated that while users believe that ratings agencies are slow to respond to changes in corporate credit quality, over 83 percent of the surveyed population believe that ratings accurately reflect the issuer's creditworthiness.

There is scope to enhance the general level of understanding of credit ratings. Enhanced understanding will have direct benefits for investors as well as for the broader financial system, as investment funds will become better aligned with

the investor's ability to accept risk. The more the public uses ratings as a tool to help determine where funds are placed, the stronger will be the incentives on the management and owners of deposit takers to operate their businesses in a prudent and sustainable fashion.

The Government recognises this issue and has, through the Retirement Commission, initiated a National Strategy for Financial Literacy, which will help to deal with some of the above issues.⁸ The Reserve Bank supports these financial literacy initiatives. Improved financial literacy, including better understanding of credit ratings, will promote the ongoing operation of an effective financial system.

Ratings cannot determine the suitability of an investment for an individual

As ratings are a generic assessment of creditworthiness, they should not be used to determine the suitability of any particular investment for any particular individual. Ratings cannot recognise the individual circumstances of investors and should be only one of a number of factors that investors or advisers take into account when making investment decisions.

Today, credit ratings provide retail investors with a valuable tool to compare risk across different institutions or investment opportunities. Intermediaries and offer documents also have a role, but can be costly, conflicted or potentially complex. Ratings, by contrast, are freely available (where the issuer has sought a rating) and relatively simple, so should form part of the decision-making process of any investor (RBNZ, 2006).

Investors should be aware of the limitations of ratings, though, and should not rely solely on them. In particular, the Reserve Bank recommends caution in the use of ratings from agencies without an established track record of consistent and unbiased rating, that can be matched to a comprehensive default history.

Most importantly, credit ratings do not replace personal responsibility when making investment decisions. It remains up to individual investors to make the ultimate risk decision.

⁸ See www.retirement.org.nz

4 The benefits of credit ratings to the financial system

The use of credit ratings in the financial system has a number of significant benefits for rated financial institutions, investors and regulators. In some cases, as noted, the Reserve Bank prudential rules require credit ratings to be obtained, because of these benefits.

Independent assessment of risk

Independent assessments of credit risk, in the form of credit ratings, are desirable features of a modern financial system because they improve transparency for investors and depositors. This improves the depth of the financial system, by allowing entities that may not traditionally have had access to some types of funding to be able access such sources. Greater financial market depth also presents investors with more choice. Finally, credit ratings form a valuable part of the information set for prudential regulators.

Overcome information asymmetry

The financial system channels surplus funds from savers to those that have a productive opportunity to use those funds. Without the financial system, the economy could not grow or function efficiently (Mishkin, 2001).

A very common and serious impediment to the efficiency of this intermediation is information asymmetry. This asymmetry is where the provider of funds in a transaction has much less information about the investment's quality than the user of funds. Mandatory disclosure of credit ratings can go a long way towards addressing this asymmetry.

Improve the safety and soundness of institutions

The use of credit ratings by regulators is not new. The US introduced the regulatory use of ratings in 1931 (Levich, 2002). Since then, ratings have been used to assess risk in a variety of other activities as regulators have seen the utility of ratings as a tool to support the safety and soundness of financial institutions and of the financial system as a whole.

Most recently, the tradition of regulators using credit ratings has been continued with the Basel Capital Framework, which uses credit ratings in the calculation of regulatory capital minima for financial institutions.

Improve information about risk

The use of credit ratings for deposit takers and banks supports investors' ability to make informed choices about risk. As credit ratings are a simple summary measure of relative risk, they can be easily understood by retail depositors who don't have the time or expertise to comb through extensive financial reports and analytical assessments.

There is no minimum credit rating threshold that institutions need to obtain to operate in the New Zealand market. Reliance is placed on market participants' capacity to assess and compare risk and to allocate and price resources optimally. The use of ratings in New Zealand is therefore not about seeking to eliminate risk, but rather to enable relative risk levels to be well signalled and priced.

Simplicity

Clear and unambiguous disclosure is central to this outcome. In the absence of simple measures such as credit ratings, investors have few alternatives but to review and try to compare often complex offer documents, or rely on the advice of financial intermediaries.

Credit ratings provide a simple metric that investors can use when they consider where to place their funds.

5 Conclusion

Notwithstanding the recent criticism of credit rating agencies in respect of complex financial instruments, credit ratings of traditional financial business such as found in banks, deposit takers and insurers still have a very useful role to play in strengthening market discipline and enabling investors to make more informed decisions.

For investors, the virtues of credit ratings lie in their wide availability, their ability to convey a simple measure of risk, and the way in which they enable investors to easily compare

alternative investment opportunities. In so doing, ratings support the superior allocation of financial resources that is essential for a productive economy.

Having said that, credit ratings are not a panacea for investors. This article has highlighted some of the limitations of ratings that investors should be aware of. Prudent investors should always supplement credit ratings with consideration of their own personal circumstances, their risk appetite, their personal investment strategies and prevailing market conditions. It remains up to investors to make the ultimate risk decision. Nonetheless, ratings are a very useful tool that research shows is under-utilised by New Zealand investors.

Looking forward, it is likely that the utility of ratings, both for investors as an informational tool and for regulators as a way of strengthening market- and self-discipline on financial institutions, will increase as more institutions are required to be rated and as more people use ratings as a way of determining where to place their funds.

To this end, the Reserve Bank remains supportive of the use of credit ratings. We will continue to promote initiatives that will deepen the public's understanding and use of ratings, and make for a more resilient financial system in New Zealand.

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DISCUSSION PAPERS**DP2008/11****Limited-information estimation and evaluation of DSGE models***Martin Fukac and Adrian Pagan*

We advance the proposition that dynamic stochastic general equilibrium (DSGE) models should not only be estimated and evaluated with full information methods. These require that the complete system of equations be specified properly. Some limited information analysis, which focuses upon specific equations, is therefore likely to be a useful complement to full system analysis. Two major problems occur when implementing limited information methods. These are the presence of forward-looking expectations in the system as well as unobservable non-stationary variables. We present methods for dealing with both of these difficulties, and illustrate the interaction between full and limited information methods using a well known model.

DP2008/10**Incorporating judgement with DSGE models***Jaromír Beneš, Andrew Binning, and Kirdan Lees*

Central bank policy-makers often cast judgement about macroeconomic forecasts in reduced form terms, basing this on off-model information that is not easily mapped to a structural DSGE framework. We show how to compute forecasts conditioned on policy-maker judgement that are the most likely conditional forecasts from the perspective of the DSGE model, thereby maximising the influence of the model structure on the forecasts. We suggest using a simple implausibility index to track the magnitude and type of policy-maker judgement. This is based on the structural shocks required to return policy-maker judgement. We show how to use the methods for practical use in the policy environment and also apply the techniques to condition DSGE model forecasts on: (i) the long history of published forecasts from the Reserve Bank of New Zealand; (ii) constant interest rate forecasts; and (iii) inflation forecasts from a Bayesian VAR currently used in the policy environment at the Reserve Bank of New Zealand.

DP2008/12**The relative size of New Zealand exchange rate and interest rate responses to news***Andrew Coleman and Özer Karagedikli*

This paper examines the relative size of the effects of New Zealand monetary policy and macroeconomic data surprises on the spot exchange rate, 2 and 5 year swap rate differentials, and the synthetic forward exchange rate schedule. We find that the spot exchange rate and 5 year swap rates respond by a similar magnitude to monetary surprises, implying there is little response of the forward exchange rate to this type of news. In contrast, the spot exchange rate responds by nearly three times as much as 5 year interest rates to CPI and GDP surprises, implying that forward rates appreciate to higher than expected CPI or GDP news. This is in contrast to standard theoretical models and US evidence. Lastly, we show that exchange rates but not interest rates respond to current account news. The implications of these results for monetary policy are considered.

DP2008/13**Real-time Prediction with UK Monetary Aggregates in the Presence of Model Uncertainty***Anthony Garratt, Gary Koop, Shaun P. Vahey and Emi Mise*

A popular account for the demise of the UK's monetary targeting regime in the 1980s blames the fluctuating predictive relationships between broad money and inflation and real output growth. Yet ex post policy analysis based on heavily-revised data suggests no fluctuations in the predictive content of money. In this paper, we investigate the predictive relationships for inflation and output growth using both real-time and heavily-revised data. We consider a large set of recursively estimated Vector Autoregressive (VAR) and Vector Error Correction models (VECM). These models differ in terms of lag length and the number of cointegrating relationships. We use Bayesian model averaging (BMA) to demonstrate that real-time monetary policymakers faced

considerable model uncertainty. The in-sample predictive content of money fluctuated during the 1980s as a result of data revisions in the presence of model uncertainty. This feature is only apparent with real-time data as heavily-revised data obscure these fluctuations. Out of sample predictive evaluations rarely suggest that money matters for either inflation or real output. We conclude that both data revisions and model uncertainty contributed to the demise of the UK's monetary targeting regime.

NEWS RELEASES

Reserve Bank accredits BNZ under Basel II Accord

30 June 2008

The Reserve Bank of New Zealand today announced that the Bank of New Zealand (BNZ) has been accredited to adopt the internal models approach for credit risk under the Basel II banking supervisory regime from the third quarter of 2008. The BNZ was accredited to use internal models for operational risk in December 2007.

Reserve Bank Deputy Governor Grant Spencer said that with today's announcement there are now four New Zealand banks accredited to use internal models for credit and operational risk under Basel II.

Mr Spencer added that in order for the BNZ to retain its accreditation status it must comply with a number of accreditation requirements. Some of these requirements relate to specific risk parameters to be used in some risk models, and improvements to be made to the bank's risk models over time. BNZ's accreditation requirements are similar in nature to those that apply to other accredited banks.

Reserve Bank issues *Statement of Intent*

30 June 2008

The Reserve Bank has released its *Statement of Intent* (SOI) for 2008-2011. Reserve Bank Governor Alan Bollard said the SOI has been written in a period of considerable uncertainty in the outlook for the economy.

"Over the last six months or so, economic activity has slowed down markedly, while inflationary pressures, especially in fuel and food prices, have continued to strengthen," Dr Bollard said.

Since August 2007, the financial system has withstood a severe test of global financial markets, triggered initially by losses in the US sub-prime mortgage market. The IMF has described unfolding events as the largest financial shock since the Great Depression.

"The adjustment process might prove to be protracted. Further volatility in world equity markets, exchange rates, and debt markets is likely," Dr Bollard said. "In this environment,

a key strategic priority for the Bank is to strengthen its prudential liquidity policy for banks."

Dr Bollard said the Bank is also implementing the new regulatory arrangements for non-bank deposit-takers and the insurance sector. A variation to the Bank's current five-year funding agreement has been approved by Government to ensure suitably qualified staff can be recruited to implement and administer the new arrangements.

At the same time, the Bank will ensure its management and systems continue to provide good support for its monetary and financial stability policy roles. A new econometric model is being introduced into the monetary policy and forecasting process and an integrated computer application is being built for collecting financial sector statistics.

The Bank's SOI includes new 'Key Performance Indicators' for the Bank, identifying the main non-financial measures and standards by which the performance of the Bank can be judged. "These indicators will evolve as we gain experience in how to use them," he said.

"Overall, this SOI reflects a strategic approach to ensuring the Bank's ability to maintain stability in an uncertain environment," Dr Bollard said.

Bill Phillips: Man, Money and Machine

1 July 2008

AWH (Bill) Phillips was a remarkable Kiwi economist and 2008 marks the 50th anniversary of his most famous creation, the Phillips Curve.

Reserve Bank Governor Alan Bollard said that Dr Phillips' influential 1958 paper on the relationship between inflation and unemployment, catapulted him to prominence as one of the most significant economists of the mid-20th century. Phillips himself regarded his article (a "wet weekend's bit of work") as of only passing interest. Nevertheless, it led to a reshaping of macroeconomic policy for decades.

"Bill Phillips led a remarkable life," Dr Bollard said. He was born in 1914 on a farm in New Zealand. He had an adventurous youth, travelling through Australia (where he ran an outback movie theatre and was a crocodile hunter).

Phillips trained as an electrician. However, his civilian life was interrupted by the Second World War, and he was captured and held as a Japanese prisoner of war. Unlike many of his cohorts, he survived; he features in the book *Night of the New Moon* (on which the film *Merry Christmas Mr Lawrence*, starring David Bowie, was based).

Arriving in London after the war, he attended classes at the London School of Economics (LSE). Dr Bollard said that despite a rather undistinguished degree in sociology, Phillips was invited to study for a post-graduate degree in economics. "Phillips was fascinated with the interactions of sectors across the economy."

Using his engineering knowledge, Phillips built a hydraulic model of the economy called the MONIAC. Today, only a few of the hydraulic models he built survive, including one located at the Reserve Bank Museum.

Phillips left London after the 1968 student riots and returned to Australasia, holding posts first at Australian National University and then at University of Auckland. Phillips died in 1975, aged just 61. "However his legacy in many fields lives on," Dr Bollard concluded.

Events being held in July 2008 to celebrate the life and work of Bill Phillips include a large international symposium attracting some of the world's top economists, two public lectures held in Auckland and Wellington, and a Reserve Bank Museum exhibition.

Dr Chris Eichbaum appointed to Reserve Bank Board

18 July 2008

Dr Chris Eichbaum has been appointed to the Reserve Bank Board, Finance Minister Michael Cullen announced today.

Dr Eichbaum is currently Senior Lecturer in Public Policy in the School of Government at Victoria University of Wellington and his previous positions include appointments in the New Zealand and Australian public service. The author of a range of academic papers and research reports, Dr Eichbaum has degrees from Canterbury and Massey Universities, and from the Australian National University. His doctoral dissertation, completed in 1999, examined central banking reforms in

New Zealand and Australia in the 1980s and 1990s.

He replaces the Rt Hon Ted Thomas whose term has expired.

The other non-executive directors of the Reserve Bank Board are John Goulter; Dr Arthur Grimes (Chair); Alison Paterson (Deputy Chair and Chair of the Board's Audit Committee); Hugh Fletcher; Paul Baines; and Dr Marilyn Waring.

The Reserve Bank Board's role includes providing the Minister of Finance with an annual assessment of the central bank's performance, which is published in the Reserve Bank's *Annual Report*.

OCR reduced to 8.0 percent

24 July 2008

The Reserve Bank today reduced the Official Cash Rate (OCR) from 8.25 percent to 8.0 percent.

Reserve Bank Governor Alan Bollard commented that "more unpleasant international news has emerged since the June *Monetary Policy Statement*, and there is a risk that the domestic economy will slow further. Moreover, the cost of funds raised abroad by banks has been rising in recent months as the international financial situation has deteriorated. Today's cut will help to mitigate the effect of these increases on the actual borrowing costs paid by firms and households.

"Recent oil and food price increases mean that annual CPI inflation should peak around 5 percent in the September quarter of this year. However, we expect that inflation will return inside the target band in the medium term. The weaker economy is expected to reduce pressure on resources, making it more difficult for firms to pass on costs and for higher wage claims to be agreed.

"Economic activity is likely to remain weak over the remainder of 2008. The ongoing correction in the housing market, together with the very high oil prices, will limit household spending and constrain the extent of recovery. However, high export prices and an expansionary fiscal policy are expected to contribute to a gradual pick-up in activity through 2009.

“Consistent with the Policy Targets Agreement, the Bank’s focus will remain on medium-term inflation. In this regard, it is important to note that monetary policy has been reasonably tight for some time, and is now restraining activity and medium-term inflation pressures. Provided that the outlook for inflation continues to improve and there is no excessive exchange rate depreciation, we would expect to lower the OCR further.”

Inflation targeting serves NZ well

30 July 2008

New Zealand’s inflation-targeting framework continues to serve the economy well, but we should be careful not to ask too much of it, Reserve Bank Governor Alan Bollard said today.

In a speech titled “Flexibility and the Limits to Inflation Targeting”, Dr Bollard said inflation targeting is the best approach New Zealand and many other similar countries have yet found for monetary policy, among a limited number of viable alternatives.

“Of course, we continue to seek improvements. But overall, and even in the current very difficult circumstances, the flexible inflation targeting framework positions us well to manage the ongoing shocks impacting the New Zealand economy.”

Dr Bollard said monetary policy works best in an environment where wider government policies promote economic stability. Together, they help maximise long-run growth performance and prosperity. But what is also needed is savings and investment behaviour geared towards growth.

“We look forward to findings of the Finance and Expenditure Select Committee’s Inquiry into the Future Monetary Policy Framework. We submitted that changes to tax and regulatory structures might help reduce their tendency to amplify economic cycles.”

Dr Bollard said the New Zealand economy is subject to powerful forces and monetary policy can only do so much to buffer the shocks.

When shocks are persistent, as with oil and food prices currently, it is difficult to judge the appropriate response.

Such price rises are driven by international supply and demand. The extraordinary oil price rise in particular has left New Zealand poorer and we all need to recognise this.

“Even if we wanted to, we could not stop such prices rising. We need to allow the initial price changes to occur, but keep monetary policy firm enough to ensure that generalised second-round inflation effects do not take hold. Quite simply, we cannot all pass on the higher costs to our customers or employers. If we do try to pass it on, then monetary policy will respond.”

Dr Bollard said New Zealand is starting from a position of high real interest rates currently, reflecting the need to restrain inflation pressure that has built up in recent years. The current weakness in the economy allows room for rates to be cut, while ensuring inflation, and inflation expectations, come down over the medium term to within the target range.

“The clear medium-term objective of 1–3 percent inflation helps to anchor inflation expectations and gives us more scope to accommodate short-term inflation shocks while ensuring that the price stability objective is not undermined in the process.”

“The long, growing and diverse list of countries that followed New Zealand after our adoption of inflation targeting 20 years ago suggests strongly that it is a monetary policy strategy that can handle a wide range of circumstances and shocks.”

National finalists announced in Monetary Policy Challenge

14 August 2008

The Reserve Bank announced today the six secondary schools that have made it through to the national final of the 2008 Monetary Policy Challenge (MPC).

All national finalists were selected from 52 schools that competed in regional finals from 4 August to 12 August 2008. Regional finals were held in Auckland, Hamilton, Wellington, Christchurch and Dunedin. Two economists from the Reserve Bank were judges.

The national finalists are: Westlake Boys' High School and Diocesan School for Girls from the Auckland regional final; Hillcrest High School from the Waikato regional final; Scots College from the Wellington regional final; Christchurch Girls' High School from the Christchurch regional final; and Columba College from the Southern Region regional final. All winning team members receive a \$50 book voucher and certificate in recognition of their achievement.

Judges were impressed with the level of comprehension each winning team demonstrated in their written submission and oral presentation. "Their ability to take the economic theory they had learned in the classroom and apply it to a real-world situation took a great deal of skill," they commented.

The MPC is designed to expand senior secondary school economics students' understanding of monetary policy and links to NCEA achievement standards.

Just like economists working in the Reserve Bank, each team analyses the economic conditions facing New Zealand and the outlook for inflation. On the basis of that analysis, they decide on an appropriate setting for the Official Cash Rate (the Reserve Bank's interest rate). Each team presents the reasons for their decision in a written submission and, if selected as a regional finalist, an oral presentation.

Reserve Bank Governor Alan Bollard said: "The Challenge gets students thinking about how the New Zealand economy works, what influences it and the impacts of economic policy. It confronts students with the difficulties and considerations involved in a decision-making process. And tomorrow's New Zealand is going to need people with these skills, to help us do better."

The national final takes place at the Reserve Bank in Wellington on Thursday, 21 August. The winning team will receive \$2,500 for their school and will be invited back to the Reserve Bank on 11 September 2008 to watch the Governor announce the *Monetary Policy Statement*.

RBNZ MPS/OCR and FSR dates for 2009

18 August 2008

The following is the Reserve Bank's schedule for the release of its quarterly *Monetary Policy Statements* and Official Cash

Rate announcements for 2009.

Each *Monetary Policy Statement* includes within it an OCR announcement, so, as usual, in total there will be eight OCR announcements during 2009. Each announcement will be made at 9.00 am on the day concerned.

The two *Financial Stability Report* release dates are also confirmed for 2009.

29 January	OCR announcement
12 March	<i>Monetary Policy Statement</i>
30 April	OCR announcement
13 May	<i>Financial Stability Report</i>
11 June	<i>Monetary Policy Statement</i>
30 July	OCR announcement
10 September	<i>Monetary Policy Statement</i>
29 October	OCR announcement
11 November	<i>Financial Stability Report</i>
10 December	<i>Monetary Policy Statement</i>

The Reserve Bank reserves the right to make changes to this schedule, if required due to unexpected developments. In that unlikely event, the markets and the media will be given as much warning as possible.

Relief from high remittance costs

19 August 2008 (Niue)

The cost to Pacific workers of remitting money from New Zealand will drop when proposed regulatory changes are made, Prime Minister Helen Clark announced today at the Pacific Islands Forum in Niue.

"Many Pacific people living permanently or working temporarily in New Zealand, regularly remit money home to their families," Helen Clark said.

"Currently the average cost of remittances to the Pacific is between 15 and 25 percent of the monetary value of the remittance, thus greatly reducing the value of their earnings.

"The Labour-led Government wants remittance transfer

services between New Zealand and the Pacific region to be transparent, lower cost, safe, and efficient. Spearheaded by work undertaken by the Ministry of Pacific Island Affairs, NZAID, and the Reserve Bank of New Zealand, the goal is to reduce the transaction cost of remittances to between 5 and 7 per cent by 2009," Helen Clark said.

"This month our government is releasing a discussion document on a proposal for a remittance card facility regulation. The new regulation would make it possible for mainstream financial institutions to offer a two-card remittance transfer facility using international ATM and EFTPOS networks. This facility would allow people to load money onto a remittance card account in New Zealand and then have family or friends withdraw that money in the Pacific. This process would incur much lower transaction fees than do current arrangements.

"The new regulation could be in force by the end of September, paving the way for commercial products to come on the market," Helen Clark said.

Remittances to the Pacific region tripled over the past decade to reach US\$425 million, according to recent figures from the World Bank. New Zealand is one of the main source countries. The World Bank says unofficial or unrecorded remittances could add at least another 50 percent to the official estimate.

NZ financial system sound, functioning well – RBNZ

21 August 2008

The New Zealand financial system is fundamentally sound and continues to function well, despite recent headlines of financial stresses, Reserve Bank Head of Prudential Supervision Toby Fiennes said today.

Speaking to an Auckland business audience, Mr Fiennes said investors have been hurt and others unsettled by recent failures of local financial firms, frozen mortgage trust funds, and potential bad debt provisions by international banks.

"I can assure you we are well aware of the cost for people who have been unfortunately caught up in the fallout," he said. "But it is important to keep a sense of perspective.

"The majority of institutions, accounting for over 90 percent of household financial assets, are not directly affected by these current events. These institutions are well capitalised businesses and give no apparent reason for concern."

Mr Fiennes said many of the failures arose from a downturn in the property development sector. The main casualties have been the property lending finance companies, where investors have been exposed to significant risks in exchange for a relatively small margin over bank deposit rates.

The international credit crunch has also meant that funding for financial institutions is harder and more expensive to access, exacerbating the pressures.

"Our banks are navigating their way through the current turmoil well. Capital positions are well above the minimum levels required by regulation. Credit ratings remain strong. And loss provisioning is not abnormal for this point in the cycle.

"We are monitoring the situation closely and are in regular contact with key players, including other regulatory authorities."

Mr Fiennes said that, purely as a precautionary measure, the Bank has put in place a facility where it will accept Residential Mortgage-Backed Securities as collateral for cash, giving institutions an additional funding avenue.

"This facility, like those used by other central banks, has been designed in case the global credit markets deteriorate further and make cash difficult to access, but the likelihood of this being needed remains extremely low," he said.

National winners announced in Monetary Policy Challenge

22 August 2008

The Reserve Bank announced today that Scots College from Wellington is the national winner of the Reserve Bank of New Zealand 2008 Monetary Policy Challenge (MPC). Columba College from Dunedin placed second in the national final, and Westlake Boys' High School from Auckland came third.

The national final took place at the Reserve Bank in Wellington on 21 August and was hotly contested. Three economists from the Reserve Bank were judges.

Scots College won \$2,500 in prize money for their school and will visit the Reserve Bank on 11 September to watch the announcement of the next *Monetary Policy Statement* by Governor Alan Bollard.

Columba College won \$1,500 and Westlake Boys' High School won \$750 in prize money for their respective schools. The other competitors in the national final were Christchurch Girls' High School, Diocesan School for Girls (Auckland) and Hillcrest High School (Hamilton).

The judges were particularly impressed with the depth of economic understanding shown by Scots College. "Scots College worked exceptionally well together to answer some very tough questions" they said.

The MPC is designed to expand senior secondary school economics students' understanding of monetary policy and links to NCEA achievement standards.

Just like economists working in the Reserve Bank, each team analyses the economic conditions facing New Zealand and the outlook for inflation. On the basis of that analysis, they decide on an appropriate setting for the Official Cash Rate (the Reserve Bank's interest rate). Each team presents the reasons for their decision in a written submission and, if selected as a regional finalist, an oral presentation.

Acting Reserve Bank Governor Grant Spencer said: "The Challenge gets students thinking about how the New Zealand economy works, what influences it and the impacts of economic policy. It confronts students with the difficulties and considerations involved in a decision-making process. And tomorrow's New Zealand is going to need people with these skills, to help us do better. "

The MPC is open to all New Zealand secondary school economics students and runs annually from May to August. This year over 70 schools from Whangarei to Dunedin entered the competition.

OCR reduced to 7.5 percent

11 September 2008

The Reserve Bank today reduced the Official Cash Rate (OCR) by 50 basis points from 8.0 percent to 7.5 percent.

Reserve Bank Governor Alan Bollard said: "The New Zealand economy is experiencing a marked slowdown, led primarily by the household sector. The outlook for the global economy has deteriorated further in the wake of continued financial market turmoil. In addition, the New Zealand business sector is coming under pressure from both rising costs and falling demand. While domestic activity is likely to pick up late this year as a result of personal tax cuts, increased government spending and rising rural incomes, we expect a prolonged period of household sector adjustment and below-average growth.

"The weakness in economic activity is expected to translate into lower inflation pressures in the medium term. Headline inflation is expected to peak around 5 percent in the current September quarter before trending down thereafter. However, food price inflation, exchange rate depreciation and higher wage costs will tend to keep headline inflation at elevated levels through 2009.

"With medium-term inflation pressures expected to ease, it is appropriate to move towards a less restrictive monetary policy stance. Compared to the June Monetary Policy Statement, we have brought forward some of the projected interest rate reduction, but have not altered the expected overall decline. We believe this response is warranted in light of the tightness of current credit conditions and the time it will take to affect the actual interest rates faced by households and businesses.

"Looking ahead, the scale and timing of further official cash rate reductions will depend on signs of declining inflation pressures and on exchange rate adjustments."

PUBLICATIONS

Regular publications

Annual Report

Financial Stability Report

Monetary Policy Statement

Reserve Bank of New Zealand Statement of Intent, 2007-2010

Published in October each year.

Published six-monthly. A statement from the Reserve Bank on the stability of the financial system.

Published quarterly. A statement from the Reserve Bank on the conduct of monetary policy.

Recent Reserve Bank Discussion Papers

2008

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| DP2008/01 | Some benefits of monetary policy transparency in New Zealand
<i>Aaron Drew and Özer Karagedikli, January 2008</i> |
| DP2008/02 | Explaining movements in the NZ dollar – central bank communication and the surprise element in monetary policy?
<i>Özer Karagedikli and Pierre L Siklos, January 2008</i> |
| DP2008/03 | Changes in the transmission mechanism of monetary policy in New Zealand
<i>Aaron Drew, Özer Karagedikli, Rishab Sethi and Christie Smith, February 2008</i> |
| DP2008/04 | 'Automatic' cycle-stabilising capital requirements: what can be achieved?
<i>Tim Ng, February 2008</i> |
| DP2008/05 | How do housing wealth, financial wealth and consumption interact? Evidence from New Zealand
<i>Emmanuel De Veirman and Ashley Dunstan, February 2008</i> |
| DP2008/06 | The tax system and housing demand in New Zealand
<i>David Hargreaves, February 2008</i> |
| DP2008/07 | Heterogeneous expectations, adaptive learning, and forward-looking monetary policy
<i>Martin Fukac, May 2008</i> |
| DP2008/08 | A macro stress-testing model with feedback effects
<i>Mizuho Kida, May 2008</i> |
| DP2008/09 | Analysing shock transmission in a data-rich environment: A large BVAR for New Zealand
<i>Chris Bloor and Troy Matheson, May 2008</i> |
| DP2008/10 | Incorporating judgement with DSGE models
<i>Jaromír Beneš, Andrew Binning and Kirdan Lees, September 2008</i> |
| DP2008/11 | Limited information estimation and evaluation of DSGE models
<i>Martin Fukac and Adrian Pagan, September 2008</i> |
| DP2008/12 | The relative size of New Zealand exchange rate and interest rate responses to news
<i>Andrew Coleman and Özer Karagedikli</i> |
| DP2008/13 | Real-time Prediction with UK Monetary Aggregates in the Presence of Model Uncertainty
<i>Anthony Garratt, Gary Koop, Shaun P. Vahey and Emi Mise</i> |

A full list of Discussion Papers is available from Administration, Economics Department.

Selected other publications

Testing stabilisation policy limits in a small open economy: proceedings from a macroeconomic policy forum
Finance and Expenditure Select Committee inquiry into the future monetary policy framework: submission by the Reserve Bank of New Zealand

Pamphlets

Explaining Currency

Explaining Monetary Policy

The Reserve Bank and New Zealand's Economic History

Central Banking in New Zealand

This is the Reserve Bank

Your Bank's Disclosure Statement – what's in it for you?

Snakes and Ladders – a guide to risk for savers and investors, by Mary Holm

For further information, go to www.rbnz.govt.nz, or contact:

Knowledge Centre

Knowledge Services Group

Reserve Bank of New Zealand

2 The Terrace, P O Box 2498

WELLINGTON

Phone (04) 4722-029

Articles in recent issues of the Reserve Bank of New Zealand *Bulletin*

Vol. 70, No. 3, September 2007

A profile of the NZ dollar exchange market

Price changes by firms in New Zealand – some evidence from the Quarterly Survey of Business Opinion

Payments and the concept of legal tender

Vol. 70, No. 4, December 2007

Housing

Lessons learned from the Economics Department's research work on household balance sheets and related issues

Households' attitudes to savings, investment and wealth

Microeconomic analysis of household expenditures and their relationships with house prices

Introducing the MONIAC: an early and innovative economic model

Vol. 71, No. 1, March 2008

Money and credit

The use of money and credit measures in contemporary monetary policy

Recent trends and developments in currency

The Reserve Bank, private sector banks and the creation of money and credit

Future directions for Reserve Bank financial statistics

The business cycle, housing and the role of policy

Vol. 71, No. 2, June 2008

The New Zealand business cycle and monetary policy

Some perspectives on past recessions

The changing transmission mechanism of New Zealand monetary policy

The relationship between financial stability and monetary policy

The themes and thinking behind New Zealand's 1967 decimal coin designs

Establishing technical specifications for New Zealand's new 10 cent, 20 cent and 50 cent coins